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THE PHARMACEUTICAL MANUFACTURER AND ACADEMIC RESEARCH

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PHILADELPHIA

UNTIL a few years ago, satisfactory co-operation in medical research between a commercial house and an academic research group seemed a definite impossibility. The academic group vividly remembered the pains and disappointments of what Dr. John Stokes calls the "scrimmage era" of pharmaceutical manufacturing, and eyed commercial houses with "invincible distrust, aroused by admittedly distrust-deserving tactics in ultra-distrustful minds."

As time went by, however, certain firms gradually expiated the sins of their fathers; and today a new relation in research is beginning to exist between the pharmaceutical manufacturer and the academic investigator. It has become evident that the first-class commercial houses can be trusted, and that they have much to contribute to a research partnership.

Paradoxically enough, one advantage of the academic-commercial relation lies in the fundamentally different approaches of the scientist and the businessman to a given problem. The scientist is with few exceptions deeply, almost exclusively, immersed in his own specialty. Also, he is by temperament an intense individualist. Yet the increasing complexity of modern medical research makes teamwork and a knowledge and appreciation of contributing technics ever more important. The businessman is essentially an organizer, working through human beings rather than in a specific science. His success depends on his ability to harmonize and dovetail the individual contributions of men who know more than he does, and this organizational approach is often as useful in research as it is in other fields.

This basic psychologic difference between scientist and businessman necessitates a real effort toward tolerance and understanding on both sides, but without this difference the partnership would be less effective. In the co-operation of manufacturer and academic research group, each contributes a mental make-up that the other lacks, and this is one reason why the relation can be made a constructive one.

Moreover, the commercial house is organized to do many things that are difficult for an academic institution. For example, it can operate as a most valuable liaison agent, keeping in touch with those working on the same problem—perhaps with other clinicians, perhaps with workers in allied sciences. By its foreign contacts, it can secure information from other countries or obtain rare materials or new drugs. Its clerical force can furnish, without delay, skilled stenographic help, statistical assistance, library work and so forth, and can take in its stride the many "little jobs" that normally make such inroads into the scientist's time and energy.

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Since the term "medical research" covers a wide field, it seems worth while to consider in some detail certain types of medical research that are especially adapted to academic-commercial collaboration.

Perhaps the commonest relation, and the simplest, is that involved in the clinical testing of a new drug. Let us suppose that the manufacturer has evolved a new compound and has carried through a preliminary study of its pharmacology and its toxicity in animals. He believes that it may be of value in the treatment of human disease and wishes to arrange for its clinical evaluation by an academic investigator.

A mutual understanding and appreciation must imbue this relation. Each partner must respect the contribution of the other. The manufacturer must realize that it will require much time and much money to test the new drug adequately, and to define its field of usefulness precisely. Until these steps have been completed, he must firmly resist all pressure by his sales department to "jump the gun" in marketing the product, or even to

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publicize it on the side by premature or unauthorized references to the investigator's findings. The clinician, on the other hand, must not underestimate the difficulties — and the importance — of the chemical and pharmaceutical work done by the manufacturer's research staff.

Another fact that must be borne in mind by both parties is that, without a definite interest in the specific problem on the part of the investigator, satisfactory research cannot be obtained by mere money. The institution may be tempted to obtain funds for some needy department or for some worthy student. The manufacturer may be desperately anxious to have a particular study done. Yet, unless the project is of real interest to the investigator and to his department head, both manufacturer and institution will regret any arrangement they enter into. The scientist will have made the fatal mistake of working for financial assistance rather than for the intrinsic interest of the problem, and the commercial house will be extremely lucky to get even second-rate work. (Usually such a study bogs down and remains uncompleted, with apologies and guilty consciences on both sides!)

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It is obvious that the academic group is invaluable to the commercial house for the clinical testing of promising compounds. Less well recognized is the fact that, in many clinical problems, the commercial house can give the academic group most useful chemical and pharmaceutical assistance. Unquestionably the ablest brains in pharmacology and clinical research are to be found in the universities. Conversely, many of the ablest chemists are employed by pharmaceutical houses. In addition, the laboratory equipment of commercial firms surpasses that of most universities, at least in the field of medicinal chemistry. The pharmaceutical manufacturer has the funds to buy, and as a competitive enterprise must buy immediately, the latest research equipment, whatever the expense.

Furthermore, in a commercial laboratory there is no interruption for teaching duties, no time out to prepare new courses. Much as the academic chemist might like to help out the medical department, he frequently cannot spare the time from his own departmental duties.

In short, the commercial house can lend to its academic partner first-class chemical — and pharmaceutical — brains, first-class equipment and undivided interest. Its assistance may begin in the very first part of the problem, when existing compounds need to be modified to avoid undesirable side effects or to obtain more intense action. Its greatest service, however, may very easily be in that difficult stage between test tube and mass production, when the new drug is needed in sufficient quantities for large-scale clinical trial.

To implement this chemical assistance, it is often helpful for the manufacturer to establish a fellowship supporting a chemist, who becomes an integral part of the clinical research group and who also serves as a connecting link between that group and the manufacturer's chemical staff.

Again, the pharmacological testing of promising compounds is often a real problem for the clinical research group, and here, as in the case of chemistry, the commercial house can often provide assistance. Certain work may be clearly needed that the university department of pharmacology cannot carry out because of the press of teaching or a previous research commitment. In such cases, a fellowship from the commercial house may supply the additional man power needed, a grant for equipment may open up an annoying bottleneck, or the work may be done by the manufacturer's own pharmacologists.

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The most obvious contribution of a pharmaceutical house to academic research is, of course, financial support. In these days of low interest rates and heavy taxation, universities are faced with reduced income from the gifts of individuals and even from foundations. More and more they must look for help either to a governmental agency or to commercial houses. Indeed, both these sources of income are needed if medical research is not to suffer.

Furthermore, quite evidently a way is being found by which commercial support can be received without hampering the search for scientific truth. In the old days, acceptance of commercial grants for research work automatically implied at least a taint of "commercialism." Today, a glance at the list of contributors to any leading medical school almost always reveals the names of pharmaceutical firms.

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So far, a rosy picture has been painted of the academic-commercial partnership and of its advantages to medical research. It cannot be denied, however, that in this partnership there are definite difficulties that must be recognized and faced.

For example, the academic research group may seek the chemical co-operation of a manufacturer in developing a product that it — the university — has discovered. Is it fair for the manufacturer to gain large monetary rewards for the distribution of this product while the university receives none? On the other hand, are not patents by an academic body — however handled — likely to complicate, both practically and spiritually, its search for scientific truth? Again, in a really effective co-operative effort, there is always the like-

lihood that certain discoveries — perhaps improvements on the original idea — will be joint findings. Some will be patentable. To whom does the patent belong? Other discoveries may not be patentable. How shall they be handled?

One cannot answer these questions in any general terms. Much depends on the basic policy of the academic group. Equally important is the degree of its confidence in the particular commercial house, and this should grow, preferably, through a continued relation. Often the university does not realize the strength of its position. If one of its own scientists has discovered a compound, and university policy admits of patenting, it has a legal checkrein to control the standards of manufacture and marketing. And even when patent rights are joint, or technically belong to the manufacturer, the latter must either be guided by the university's wishes or jeopardize the very relation that has developed the product.

As a matter of fact, the importance of the actual letters patent is usually overemphasized. Few people realize that no patent can be considered more than presumptive until it has been adjudicated by the courts — and, incidentally, I believe that the Supreme Court has upheld only four patents in the last fifteen years. The research scientist is under the impression that a commercial house considers an exclusive patent a *sine qua non*, whereas in many cases all the manufacturer asks or needs in his marketing is a head start over competitors. He naturally secures this start if he has been closely associated with the product's development, but he retains his advantage only during good behavior. If his prices are too high, if he neglects possible improvements, competition overtakes him.

In the academic-commercial partnership, therefore, it is not impossible to work out a satisfactory solution to patent questions, even though each instance presents an individual problem. More important than legalities and contracts is the factor of mutual confidence. Without this, no formal patent policy can be wholly satisfactory. With it, a sound handling of patents can almost always be achieved.

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Of less fundamental importance than the patent problem, but at times productive of a strain on the academic-commercial relation, is the question of when and on what basis grants should be terminated. In certain cases it is possible to agree in advance on a definite grant for a specified term. Even so, the wise manufacturer mentally sets aside a certain sum each year for necessary expenses that cannot be foreseen. Furthermore, he will not be too disturbed if, at the end of the period originally fixed, a research project is like a house with its walls all built but no roof, necessitating an extra year's grant to prevent the preceding work from being wholly lost.

Most research problems, however, are distinctly indefinite from the beginning. The association between university and manufacturer just grows, and grants grow with it. A particular project of mutual interest is started. The commercial house pays the salary of a young physician who is to work under the chief clinical investigator. Results are encouraging. Later the commercial house supplies a chemist. Next, a couple of technicians are added.

All this is perfectly satisfactory while active study in the chosen field of mutual interest is going forward. But the day inevitably comes when the particular project is at an end. It may have resulted in a new compound, marketed by the commercial house. Or it may have proved unproductive, and the interest of the research group may have been diverted to quite different fields, fields in which a pharmaceutical house — or the particular firm — can make no foreseeable contribution.

For how long, in such a situation, should the commercial house continue its grant? Here, as in the case of patents, there is no hard and fast rule. But if certain lines of thought are adhered to — and, if possible, put down on paper at the start — strain on the relation can be greatly eased. As a cardinal principle, all grants should be made with a clear understanding that they will be rediscussed at a time sufficiently in advance of their termination to allow all concerned to make suitable plans for the future. If the original grant was for more than a year, this discussion should take place at least a year before the termination date.

Furthermore, there should be a fundamental distinction between the general support of a research group — or of an individual investigator — and the supplying of technical assistance for a specific project. It is entirely reasonable for those in charge of a commercial house to support a major investigator, even though he is working on a project that is of no immediate interest to them. They may be grateful to him for past help. They may hope that later on he will turn to work that *is* of interest, or they may believe that he is a man of outstanding ability, whose efforts should be encouraged on general principles.

But grants for technicians are on a somewhat different basis. Although the commercial house can well be expected to supply technical help for a project of interest to it at the time, it is scarcely reasonable to expect this support to continue after the conclusion of the specific problem. Yet technicians easily drift into a more or less permanent status on a department's staff, and subsequent

withdrawal of financial support, unless it has been anticipated, will dislocate the whole organization.

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Probably the most complicated form of academic-commercial relation is an association over a considerable period of years between an academic research group and a manufacturer. But it is also the one most likely to yield maximum benefits.

In modern medicine there is a growing realization, as President Conant of Harvard University has put it, that if research is to progress "only a group can furnish the collective ability required: the chemist transforming one drug to another; the pharmacologist studying its fundamental action on animals and man, and the clinical investigator bringing his knowledge of the actual problems of therapeutics — all these must join hands and pool their ideas."

Selected commercial houses can well be made a part of this team, not only to give assistance in the actual research work, but also to translate the results of that research into practical clinical application. After all, an academic research group has been working in a vacuum unless its findings are eventually made available to the medical profession as a whole. Where a new drug is involved, this can only mean that *some* manufacturer must advertise and distribute it. And much is gained if this manufacturer is one who has demonstrated his integrity and his qualifications through past collaboration.

It is, of course, possible for a scientist merely to announce his discovery and leave its commercial aspects open to competition. But this almost inevitably results in a hasty, unsupervised rush for the market, with a consequent loss of the service that a preselected manufacturer can perform — not only in research, but also in marketing the product under the guidance of the academic group.

Frequently the research scientist does not appreciate the gulf between his own specialized field and the daily work of the average practitioner. For a new drug to be properly utilized, it is not enough for its discoverers to know, however thoroughly, its indications, effects and limitations. They must also know the viewpoint of the average practitioner, his diagnostic facilities and the conditions actually encountered in his practice. Precisely this information is revealed by the manufacturer's field investigations.

Although pharmaceutical advertising should not usurp the function of medical teaching, it can be made a great force for good. It is infinitely more constructive for leaders in medicine to direct this force than for them to dismiss it as "mere advertising." To disseminate knowledge of a new therapeutic agent accurately and effectively, manufacturer and scientist must co-operate. Sympathetic scientific guidance can raise the whole standard of pharmaceutical marketing.

When the Duc d'Enghien was executed, Fouché, Napoleon's minister of police, remarked, "It was worse than a crime, it was a blunder." In the same sense, a commercial house must be stupid as well as unscrupulous to cut its own throat by distorting an investigator's findings in an effort to present a favorable advertising picture. Actually no one has more at stake than the manufacturer in obtaining and disseminating the true facts about his product. No one is so hurt when the results in actual practice fall short of the promises made. The physician who writes an overenthusiastic paper suffers in reputation alone. But the manufacturer who puts out exaggerated advertising almost always eventually suffers not only in reputation but in pocketbook as well.

Not only in research but in the actual marketing of his products, a farsighted manufacturer appreciates that he has much to gain by real sincerity in his co-operation with an academic group. To make the relation a commercial success — even if this is his only criterion — the manufacturer must give to medical science more than lip service. From the merest self-interest he must take the long-range point of view and sacrifice immediate commercial gains for the advancement of medicine and the trust and confidence of his university partner. Thus, in almost any difference of opinion with the academic group, he, the manufacturer, must be the one to yield.

In short, although their approaches to a given problem may seem diametrically opposed, the true interests of the research worker and the manufacturer are in reality similar. Clinical and commercial values are almost always identical. A drug that has merit is virtually certain to be a financial success. A drug that fails to fulfill the claims made for it is likely to be a costly enterprise, a sinkhole into which advertising and sales money are poured. It requires neither altruism nor genius on the part of the manufacturer to realize that "honesty is the best policy."

* * *

In developing a new drug and establishing its use by the profession, a number of separate steps must almost always be taken: chemical synthesis or modification, animal pharmacology, human pharmacology, clinical testing and general marketing. It is more and more evident that neither manufacturer nor university can effectively handle all these steps without the help of the other. If the best interests of both are to be served, they must work together to eliminate the last remaining barriers to their collaboration.

ACUTE APPENDICITIS IN PATIENTS WITH THE COMMON CONTAGIOUS DISEASES

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THE records of patients admitted to the Willard Parker Hospital for Contagious Diseases between January 1, 1935, and April 1, 1941, were reviewed for the concomitant incidence of acute appendicitis. In a high percentage of these cases, the appendix was already gangrenous or ruptured. Apparently diagnosis and surgical intervention had been delayed. This may be attributed to the presence of rash or other stigmas of the contagious diseases that tend to deflect the physician's attention from the abdomen. Although it is true that nonappendiceal abdominal symptoms are common during the course of the various communicable diseases, this fact should not deter one from diagnosing acute appendicitis if there is sufficient evidence.

The incidence of appendiceal disease in the cases composing this study is given in Table 1.

TABLE 1. *Incidence of Appendicitis in Various Contagious Diseases.*

DISEASE	NO. OF CASES	CASES OF APPENDICITIS	INCIDENCE
			%
Measles	8,997	24	0.27
Varicella	3,576	8	0.21
Scarlet fever	9,079	9	0.09
Mumps	1,685	8	0.47
Pertussis	3,064	3	0.09
Rubella	816	1	0.12
Diphtheria	1,985	0	0.00
Totals	29,802	53	
Incidence			0.18

Only cases in which there was gross and microscopic evidence of acute inflammation of the appendix are included.

MEASLES

Only one of the standard textbooks on infectious diseases[1] describes appendicitis as a complication of measles, and that one briefly. The authors emphasize that suppuration at any stage is rare, and that temporizing is the wisest course when abdominal pain occurs during the invasive period of measles. That this neglect of an important subject has taken its toll is evidenced by the number of patients with far-advanced appendicitis admitted to the Willard Parker Hospital.

The classic report by Panum and Manicus of a measles epidemic on the Faroe Islands in 1846 describes a syndrome that strongly suggests appendicitis and its complications. At this period, acute appendicitis was not recognized as a clinical entity. The authors speak of two types of measles, the catarrhal and the gastric. The latter was characterized by colicky abdominal pains, high fever, tense rigid abdomen tender to pressure, diarrhea and vomiting. Some of the patients died, whereas others made slow recoveries. The symptoms came on early, either before or after the rash appeared.

Thenebe, Hirshberg and Cenci[2] in 1933 reported 6 cases of appendicitis among 371 measles patients admitted to the Hartford Isolation Hospital. In 1936 Hudson and Krakower[3] described 8 cases of acute appendicitis during the course of measles. Bullowa, McCabe and Wishik,[4] also reporting from the Willard Parker Hospital, have summarized 11 cases of appendicitis occurring among 6357 measles patients treated during the five years preceding our survey. Accounts of other cases in the literature[5-10] do not lend themselves well to tabulation. They differ little from those in our report. We found 24 cases of acute appendicitis (0.27 per cent) among 8997 patients with measles admitted to this hospital. Combining our figures with those of Bullowa et al., there were 35 cases (0.23 per cent) among 15,354 measles patients admitted during a ten-year period. Included in Tables 2 and 3 are the statistics from these 35 cases as well as those from 29 similar cases taken from the literature, which make our analysis more conclusive. Also mentioned in the literature, but not included in our statistics, are 8 measles patients from whom normal appendices were removed because of abdominal symptoms.

The appendicitis cases listed in Tables 2 and 3 fall in the age group between three and twelve years, averaging from five to eight years. In our own series males outnumber females by 21 to 3. In the collected group there are 37 males and 16 females, in spite of the fact that both sexes are about equally susceptible to measles. Fischer[7] reported 2 perforated cases, one in a girl of fourteen, the other in a boy of seventeen. Popper reported 1 case in a twenty-six-year-old man. Other single cases reported have been in children under eight.

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Onset

Appendicitis complicating measles apparently tends to occur during the invasive and catarrhal period of the disease—from six days before the rash to four days after its appearance. Contrary to general opinion, appendicitis may occur in the prodromal stages and at the onset of the eruptive stage as frequently as it does after the rash is already established. In the collected series, 19 cases had their onset during the prodromal stage, 7 occurred on the same day as the rash, and 27 developed after its appearance.

In practically all our cases, white-cell counts and differentials were made just before the operation. The statistics shown in Table 4 were compiled from cases in the literature, as well as our own. From these figures it can be seen that the white-cell counts and differentials in acute appendicitis complicating measles are about the same as they would be without the underlying contagion. In uncomplicated measles there is a leukopenia supposedly due to depression of the bone marrow with consequent relative lymphocytosis.

In general, with the usual exceptions,[6, 7] the white-cell count and differential are of some value in determining whether the appendix has been invaded by pathogenic organisms. Given a patient with a known exposure to measles, no rash, respiratory and abdominal symptoms, indefinite appendiceal signs and a low leukocyte count, it is fairly safe to assume that one is dealing with

TABLE 2. *Acute Appendicitis Complicating Measles: Perforated Cases.*

Case No.	Age	Sex	Interval between Abdominal Symptoms and Rash: Before	Interval between Abdominal Symptoms and Rash: After	Interval between Abdominal Symptoms and Operation	White-Cell Count	Polymorphonuclear Leukocytes	Complication
	yr.		*days*	*days*	*days*		%	
Willard Parker Hospital, 1935–1941								
1	5	F	5		2	13,000	80	General peritonitis
2	5	M		4	0	19,800	86	Local abscess
3	6	M		2	1	17,000	88	General peritonitis
4	7	M	2		2	9,100	88	Local peritonitis
5	7	M	Same day		4	14,250	94	General peritonitis
6	6	M		2	2	22,450	85	General peritonitis
7	7	F		2	1	10,800	91	General peritonitis
8	4	M		3	2	28,800	86	General peritonitis
9	3	M		2	4	16,300	83	General peritonitis
10	5	M	2		3	15,500	84	Local peritonitis
11	4	M	5		2			Local abscess
12	6	M	Same day		2	13,250	84	Local abscess
Thenebe, Hirshberg and Cenci[5]								
1	5	M		12	2			Local abscess
2	5	M		2	1	14,300	80	General peritonitis
3	5	F		1	1	9,400	79	Local abscess
4	6	M	Same day		16	40,000	92	Pelvic peritonitis with abscess
Hudson and Krakower[3]								
1	7	M	Same day		8			Appendiceal abscess
2	8	F	Same day		11			Appendiceal abscess
3	6	F	1		2			Suppurative; local abscess.
4	9	M		4	13			Appendiceal abscess
5	7	M		3	7			Appendiceal abscess
6	6	F		2	1			Local abscess

Bullowa, McCabe and Wishik[4]

11 cases with local or generalized peritonitis

Sex: 4 males, 7 females

Age: 3–8 years

White-cell count: 12,000–21,800, with 76–89 per cent polymorphonuclear leukocytes

Time of onset:

Before Rash		After Rash	
No. of Cases	No. of Days	No. of Cases	No. of Days
1	5	1	1
1	6	2	2
		2	3
		2	4

Interval between onset of abdominal pain and operation: 2, 4, 5 and 6 days

Deaths: 2

pseudoappendicitis. This is the type of case, however, that must be observed carefully for signs of progression.

Table 2 lists 33 cases in which the appendix was perforated before operation. Twenty-six of these cases developed during the stage of eruption. There was an average wait of four days between the onset of abdominal symptoms and operation, in the perforated cases, and an average wait of one day in the unperforated ones (Table 3). This does not indicate that appendicities is more virulent when it arises in the eruptive stage, but rather demonstrates how the presence of a rash leads to delay in diagnosis.

In all the ruptured cases in our series except 1, the appendix was perforated before admission and while the patients were under the observation of a physician. This indicates that lack of familiarity with this complication leads to unwise procrastination.

The treatment for this complication of measles is exactly the same as that for appendicitis under any other circumstances. Operation in our series was performed as soon as a positive diagnosis was made, except in a few cases where dehydration and acidosis were first relieved with parenteral fluids. In only 1 case was it necessary to leave the appendix because of difficulty in removing it without spreading infection, although at times this is a wise procedure. Drains were used in the presence of peritonitis or cloudy fluid. Blood transfusions, Wangensteen apparatus and morphine were used freely when indicated. Chemotherapy was tried in a few cases, but the results were inconclusive. Measles convalescent serum was given intravenously to a highly toxic prodromal measles patient with a ruptured appendix and abscess. This patient, already showing Koplik's spots, had a rapid temperature drop to normal and mild rash, and was thought by several competent observers to have a noticeable general improvement.

TABLE 3. *Acute Appendicitis Complicating Measles: Unperforated Cases.*

CASE NO.	AGE	SEX	INTERVAL BETWEEN ABDOMINAL SYMPTOMS AND RASH		INTERVAL BETWEEN ABDOMINAL SYMPTOMS AND OPERATION	WHITE-CELL COUNT	POLYMORPHONUCLEAR LEUKOCYTES	TYPE OF ACUTE APPENDICITIS
			BEFORE	AFTER				
	yr.		*days*	*days*	*days*		%	
				Willard Parker Hospital, 1935–1941				
13	12	M		2	2	10,000	75	Suppurative
14	10	M	6		0	13,800	82	Not stated
15	5	M		4	0	9,850	84	Gangrenous
16	12	M	3		1	14,000	78	Gangrenous
17	7	M	1		1	8,550	80	Suppurative
18	6	M		3	1	13,000	90	Suppurative
19	7	M	Same day		0	10,050	82	Suppurative
20	10	M		2	2	13,600	89	Suppurative
21	5	F	3		1	14,200	87	Suppurative
22	5	M	4		1			Gangrenous
23	8	M	3		2	19,000	80	Not stated
24	6	M	1		0	11,000	69	Not stated
				Thenebe, Hirshberg and Cenci[2]				
5	6	F	2		2	10,000	82	Gangrenous
6	6	M	1		1	12,400	86	Catarrhal
				Davidsohn and Mera[11]				
1	6	M	4		1	17,800	77	Gangrenous
2	8	M	Same day		2	12,000	82	Suppurative
3	6	M	3		1	12,500	82	Suppurative
4	7	M		8	1	9,600	76	Suppurative
				Hudson and Krakower[3]				
7	9	F	3		1			Not stated
8	6	M		3	0			Not stated

TABLE 4. *White-Cell Counts and Differentials in Cases of Appendicitis Accompanied by Measles.*

CONDITION	NO. OF CASES	WHITE-CELL COUNT		POLYMORPHONUCLEAR LEUKOCYTES
		RANGE	AVERAGE	%
Appendix inflamed but still intact	17	8,500–19,000	12,450	60–90
Appendix perforated with abscess or peritonitis	27	9,000–28,800	15,900	76–94
Pseudoappendicitis	9	2,250–15,000	7,410	40–88 (avg. 72)

Nitrous oxide and oxygen, ether and cyclopropane were the commonest forms of anesthetic employed. Two patients developed pneumonia postoperatively within two weeks of each other in 1935, but since then there have been no respiratory complications. We are of the opinion that general anesthesia is relatively safe during any stage of measles.

We found 8 cases in which the appendix did not show enough disease to warrant its surgical removal. All the cases occurred in children between the ages of six and ten, except for 1 atypical case that occurred in a patient seventeen years old. Boys and girls were equally affected. These cases occurred only in the six days preceding, or simultaneous with, the onset of the eruption. Appendiceal symptoms coming on after the exanthem had appeared were never due to pseudoappendicitis. The leukocyte counts were for the most part normal, averaging 7410 but ranging from 2250 to 15,000. There was some evidence of an increase in the neutrophils, with an average percentage of 72. In 5 of the above cases, microscopic examination of the appendix revealed lymphoid hyperplasia.

The degree of severity of measles is apparently no indication of which case will develop suppurative appendicitis. Some of our patients had a mild form of the disease. When the patient has been exposed to measles, and at a reasonable interval develops abdominal pain, the physician should be alert to the two possibilities: benign pseudoappendicitis and true acute appendicitis.

The earlier belief that the postoperative course is particularly severe after measles is not based on fact, since our patients all made fairly rapid recoveries commensurate with the amount of abdominal disease present. There were no pelvic abscesses, fecal fistulas or cardiac decompensations, which were said by Rost[8] and others[9, 10] in the German literature to be common in these cases. Two patients in our series developed pneumonia but made rapid, uneventful recoveries.

The diagnosis of pseudoappendicitis is a difficult one and we can only offer the following suggestions. Abdominal pain, nausea and vomiting come on during the six pre-eruptive days or simultaneously with the rash. The abdominal signs more often than not are vague, and disappear when the rash is well established. The white-cell count as a rule is normal or low. The patient is usually six to ten years old. Temperature is of no aid as a differentiating point, since it may be similar to that in true appendicitis. The important point to remember is that when observation is thought necessary, the patient should be seen several times rather than once a day. If definite signs of appendicitis are present, immediate surgery is indicated regardless of coexisting signs of measles. The postoperative course in the pseudoappendicitis cases was mild and uneventful. Therefore, it is better to operate in questionable cases than to run the risk of appeasing an inflamed appendix.

It is impossible, on the basis of our study, to make a definite statement as to whether the relation between measles and appendicitis is more than coincidental. There are, however, certain facts that justify speculation.

One theory is that the lymphoid hyperplasia of measles, with or without catarrhal enteritis, sets up a chain of circumstances leading to interference with drainage and circulation in the appendix and resulting in secondary invasion by bacteria. The evidence in support of this theory lies in the fact that measles causes a moderate hyperplasia of the lymphoid tissue throughout the body, and that this is often especially well seen in the appendix that is richly endowed with lymphoid structures. Hwang and Krumbhaar[12] have demonstrated that the percentage of lymphatic tissue in the appendix is greatest in the ages between one and ten and that the female appendix contains less lymphatic tissue than the male throughout life. In the light of this work, the preponderance of males over females in our series (21 to 3) fits in well with the above theory.

Nausea, vomiting and localized pain in the right lower quadrant often accompany the catarrhal symptoms at the onset of the invasive stage of measles. These abdominal symptoms coming on in the period six days before the rash constitute the so-called "pseudoappendicitis syndrome," and may represent an actual distention of the appendix from the lymphoid overgrowth that is frequently described in microscopical descriptions of these appendices. Hudson and Krakower's[3] findings do not substantiate this theory. They compared microscopic sections from their 8 cases of appendicitis during measles with some from children in whom measles was not present. There was less lymphoid tissue, with practically no secondary centers or germinal follicles, in the group with measles, and there appeared to be more plasma cells. Because of the anatomical variations in the two groups, the authors were of the impression that the association of measles and appendicitis is more than coincidental.

The abdominal symptoms in the invasive stage usually subside when the rash appears. This may be due to exhaustion of the lymphoid reaction. However, if the physician is not alert to the fact that a certain number of these cases go on to suppuration, he will err in his diagnosis. The

tendency to devaluate abdominal symptoms because a child is thought to be incubating measles is illustrated in the following case reported from this hospital.[13] A child with abdominal pain was treated with laxatives for five days because she was apparently in the prodromal stage of measles. She died within an hour of being admitted to the hospital. Post-mortem examination revealed a ruptured appendix with generalized peritonitis. The case is not included in our statistics because the patient died before the rash appeared. A study of the cases in our series disproves the popular belief that the abdominal symptoms in the prodromal stage are due to mesenteric adenitis alone and always subside with the onset of the rash.

If one accepts the popular belief that the pathogenic agent in measles is a filterable virus present in the blood and nasal secretions, another theory suggests itself. There is evidence that the invasive and injurious action of measles is not restricted to the eyes, skin and respiratory tract, but may involve other parts of the body, including the tissues of the appendix.[14, 15] Herzberg[16] in 1932 reported for the first time the presence of Warthin-Finkeldey[17,18] giant cells in an appendix removed during the prodromal stage of measles. Davidsohn and Mora[11] in 1932 described 4 measles cases in which appendectomy had been performed. In 2, the appendix was removed two days before the rash was noticed, and microscopic study revealed many giant cells. In 1, in which the appendix was removed two days after the rash appeared, there were few giant cells. The fourth case, in which the appendix was removed nine days after the onset of the rash, had no giant cells. Case reports similar to these have been made by other authors.[3, 4, 19–23] Reports from the hospitals where appendectomy was performed on our prodromal cases made no mention of the presence of giant cells.

The described cells are large, round or irregular-shaped, with much eosinophilic or basophilic cytoplasm. There may be from three to fifty round, lightly staining nuclei characteristically clumped together in the center of the cell. Giant cells are found in various locations throughout the body, and occasionally only in the lymphoid tissues and mucosa of the appendix. These cells when found during the prodromal stage of measles are now generally recognized as a specific reaction to the measles virus or its toxin. Further evidence that the appendix may be involved directly by the measles virus is the recent finding of inclusion bodies in this organ by Broadhurst, McLean and Saurino.[24]

This problem could be further investigated by inoculating monkeys with an emulsion of an appendix removed from a prodromal-measles patient and attempting to demonstrate giant cells in the lymph nodes of the experimental animals, similarly to the recent transmission experiments of Gordon and Knighton.[25]

Is it possible, then, that if the virus does reach the appendix, it traumatizes this organ sufficiently to cause a "virus appendicitis," which may predispose the tissue to further invasion by bacterial organisms? This view suggests that a better name for pseudoappendicitis is benign virus appendicitis, and that the prodromal abdominal symptoms of measles are often due to an actual appendiceal inflammation of virus origin. An appendix that was the seat of previous inflammation or one that harbored a fecalith would be especially vulnerable to attack.

Varicella

Varicella is an acute infectious disease with mild prodromal constitutional symptoms, and is the least dangerous of the various exanthematous diseases with regard to serious secondary lesions and mortality. The commonest complication is skin infection, secondary to scratching of the varicellous lesions. Abdominal disease developing during the course of the disease is rare.

Bullowa and Wishik,[26] on summarizing 2534 cases of varicella, found that appendicitis was the only abdominal complication. They reported 5 cases, an incidence of 0.19 per cent (Table 5).

Table 5. *Acute Appendicitis Complicating Varicella (Bullowa and Wishik[26]).*

Case No.	Interval between Onset of Abdominal Symptoms and Rash: Pre-rash	Interval between Onset of Abdominal Symptoms and Rash: Post-rash	Interval between Onset of Abdominal Symptoms and Operation	Type of Appendicitis
	days	*days*	*days*	
1	2		3	Perforated, with localized peritonitis
2	1		2	Gangrenous and perforated, with localized peritonitis
3		1	1	Not stated
4		3	6	Gangrenous and perforated, with abscess
5	4		1	Gangrenous and perforated, with localized peritonitis

From 1935 to 1941, 8 in 3576 admissions, an incidence of 0.21 per cent, were admitted to the Willard Parker Hospital. They are described in Table 6.

Abdominal pain is an extremely rare complaint during the prodromal and eruptive stage of varicella, and its presence should suggest the possi-

bility of appendiceal disease. Appendicitis may occur at any stage of the disease. In the 13 cases from the Willard Parker Hospital, 8 had their onset in the five days before the rash, and the rest in the nine days following its first appearance. The signs and symptoms in all cases were classic for acute appendicitis. In 3 cases, the diagnosis was made more difficult because of coexisting pharyngitis. The leukocyte counts ranged from 7800 to 28,000, with 79 to 96 per cent polymorphonuclear leukocytes.

In 10 cases (76 per cent), the appendix was either gangrenous or ruptured, with cloudy or purulent peritoneal fluid.

It is interesting to note that delay in surgical intervention was commoner in the erupted cases than in the nonerupted.

There is no evidence that there is anything but a coincidental relation between varicella and appendicitis. Johnson[27] described a complete postmortem examination of an infant who died during the height of the eruptive stage, and reported the appendix as being normal. Tomlinson[28] reported a case of varicella developing three days after tonsillectomy, in which microscopic examination of the tonsils showed giant cells resembling those described as occurring during the prodromal period of measles. In 2 of our cases, the appendix was removed during the prodromal stage of varicella and showed histopathological evidence of acute inflammation, but no giant cells were found. Since the skin lesions of varicella may become infected and produce a secondary septicemia, the blood stream may serve as a route to precipitate acute appendicitis. However, none of our cases were complicated by severe skin infections or septicemia. As in some of the other contagious diseases, the low incidence of appendicitis makes it appear that it was a coincidental complication of varicella rather than a direct result of it.

The course of varicella was not modified by appendicitis. There was no specific therapy. General anesthesia was used without complications in any case.

In the cases operated on before the rash appeared, it is interesting to note that the first varicellous lesions often appeared under the adhesive tape over the abdomen.

TABLE 6. *Appendicitis Complicating Varicella (Willard Parker Hospital, 1935–1941).*

Case No.	Interval between Abdominal Symptoms and Rash		Interval between Abdominal Symptoms and Operation	White-Cell Count	Polymorphonuclear Leukocytes	Type of Acute Appendicitis
	before	after				
	days	*days*	*days*		%	
1		9	0	20,600	96	Gangrenous
2		7	2	27,800	94	Suppurative and perforated, with general peritonitis
3		2	3	16,500	82	Suppurative and perforated, with abscess
4	4		3	16,040	88	Suppurative
5	5		0	28,200	97	Suppurative and perforated, with peritonitis
6	4		0	20,500	86	Not stated
7	3		0	9,000	78	Gangrenous
8	4		1	14,000	83	Gangrenous

Scarlet Fever

The usual complications of scarlet fever are otitis media, sinusitis, cervical adenitis, mastoiditis, arthritis and nephritis. Abdominal complications occur infrequently and consist of enteritis, mesenteric lymphadenitis, toxic hepatitis and primary peritonitis. Appendicitis is rare, and according to Dick and Dick[29] does not warrant discussion.

Brandman,[30] who collected 39 cases from the literature, believes that more emphasis than at present should be placed on appendicitis as a complication of scarlet fever. He adds that it occurs more frequently in scarlet fever than in mumps, measles, varicella or tonsillar diseases. Kauffman[31] claims that the appendix is constantly involved in scarlet fever, and that this accounts for the vomiting and abdominal pain. Bullowa et al.[4] described 3 cases of appendicitis complicating scarlet fever among 6252 patients. Rolleston and Ronaldson[1] mention 2 similar cases occurring late in the disease. Toomey[32] lists this complication as being present in 9 of 6000 cases of scarlet fever. Thenebe[33] reported 4 cases of appendicitis among only 250 patients admitted with scarlet fever.

During the last five years there have been admitted to the Willard Parker Hospital 9679 cases of scarlet fever, with acute appendicitis complicating the picture in 9 cases, an incidence of .09 per cent (Table 7). This does not include 10 cases admitted during the same period in which the rash appeared postoperatively. The latter we have considered as surgical scarlet fever and have omitted from this study. Two cases were excluded although operation revealed abscess formation in the

right lower quadrant of the abdomen, because the appendix was not found. The cases reported in the literature are similar to ours, and no further information would be furnished by tabulating them.

Abdominal pain is not a common symptom during the early or late stages of scarlet fever, but nausea and emesis are present in 60 to 80 per cent of the cases. The vomiting rarely persists through the prodromal stage unless complications have already developed. The complaint of abdominal pain during the prodromal, eruptive or convalescent stage should not be taken for granted as being of the referred or secondary type until abdominal disease has been ruled out. In the cases from the literature and our own series, the abdominal pain was a prominent symptom that developed anywhere from the day of eruption to the twentieth day of the illness. Only 1 of our 9 patients complained of abdominal pain before the rash appeared, and in this case it persisted into the eruptive stage. Three patients had the onset of symptoms the same day the eruption was noticed. The remaining 5 patients complained of abdominal pain at intervals varying from the first to the nineteenth day after the scarlatinal rash. The signs and symptoms in practically all these cases were typical of acute appendicitis. There was nothing remarkable about the blood picture. The usual leukocytosis of scarlet fever was found, and the higher counts were found with complicated appendicitis cases.

As has been emphasized before, there is a tendency to delay surgical intervention in the face of obvious abdominal signs when scarlet fever complicates the picture. When in doubt it is wiser to operate, for patients who are operated on late may die of peritonitis. There were 9 perforated appendices, an incidence of 23 per cent, in the series compiled by Brandman.[30] Of the 4 cases reported by Thenebe,[33] in one the appendix was gangrenous and in another it had ruptured. In our series there were 2 deaths resulting from ruptured appendix with peritonitis. In one case surgery was not performed until the second day after the onset of abdominal pain, and in the other not until the fourth day. However, in 5 cases operated on comparatively early, that is, within thirty-six hours after onset, a gangrenous appendix, which was unruptured, was found in only 1.

TABLE 7. *Appendicitis Complicating Scarlet Fever (Willard Parker Hospital, 1935–1941).*

Case No.	Interval between Abdominal Symptoms and Rash		Interval between Abdominal Symptoms and Operation	White-C ll. Count	Polymorphonuclear Leukocytes	Type of Acute Appendicitis
	Before	After				
	days	*days*	*days*		%	
1	Same day		1	11,350	81	Not stated
2	Same day		2	13,500	78	Gangrenous
3	Same day		1	22,500	82	Not stated
4	2		4	8,500	87	Not stated
5		1	4	30,900	84	Suppurative and perforated, with peritonitis; fatal.
6		4	2	36,200	94	Gangrenous and perforated, with peritonitis; fatal.
7		12	Same day	13,450	82	Not stated
8		19	Same day	19,350	83	Gangrenous
9		19	1	20,500	85	Not stated

During the period studied there were also admitted to this hospital 10 postoperative appendectomy cases complicated by scarlet fever. In 8 cases the rash developed two to seven days postoperatively. These are classified as surgical scarlet fever cases. Brandman had 3 similar cases that he included in his series. He suggests that the abdominal symptoms were due to scarlet fever rather than to acute appendicitis. It is interesting that in 4 of our so-called surgical scarlet-fever cases, appendices were reported as being of the chronic type, while the others showed evidence of acute inflammation. There were no ruptured or gangrenous appendices in this group. It should also be noted that 6 of these patients developed infected incisions, whereas only 1 of the patients operated on after the eruption had occurred did so.

There is no characteristic pathologic picture of the appendix removed during the prodromal, eruptive or convalescent stage of scarlet fever. Appendicitis does not modify the course of the disease.

Treatment in our series consisted of surgical intervention once the diagnosis was made. Nitrous oxide, oxygen and ether was used during the catarrhal stage without producing additional complications. The use of antitoxin did not prevent appendicitis. Chemotherapy and scarlet-fever convalescent serum were employed in a few postoperative cases, and although they appeared to benefit the patient, no definite statement can be made because of the small number of cases.

Brenneman[34] claims that it is conceivable that organisms producing nose and throat infections travel to the appendix by the hematogenous or enteric route. Kojis and McCabe,[35] reporting on primary peritonitis complicating scarlet fever, tend to discredit but do not disprove the hematogenous route as the source of peritonitis. They found that out of 42 cases of scarlet fever with streptococcemia, only 1 had generalized peritonitis at autopsy. There is also no final evidence that the enteric route serves to spread the infection. Kunzel[36] found that his cultures of the appendix and intestines were sterile, whereas peritoneal and nasopharyngeal cultures grew streptococci. Another view, suggested by Thenebe,[33] is that the toxemia of this disease may have a special affinity for, or lower the resistance of, the appendix, making it more susceptible to invasion by the colon bacillus.

Autopsies of scarlet fever cases usually show a generalized lymphoid hypertrophy that is especially prominent in the mesenteric nodes but may also invade other areas of lymphoid tissue in the abdomen. This reaction as seen in the cervical and mesenteric glands may regress or go on to suppuration. Ronaldson[37] believes that although other areas of lymphoid tissue may suppurate during the course of scarlet fever, the appendix has a high degree of immunity to this disease.

Epidemic Parotitis

Abdominal pain is a rare symptom of mumps. The commonly mentioned complications are orchitis, oöphoritis, pancreatitis, encephalitis and nephritis. Several cases of appendicitis complicating mumps have been reported, but the incidence is very low.

The first case of appendicitis occurring during the course of epidemic parotitis was described by Simonin[38] in 1903. Dick[39] in 1935 stated that there was an increase in the incidence of appendicitis during mumps epidemics. Sneierson[40] in 1940 reported 2 additional cases. At the Willard Parker Hospital during the five-year period covered, 1685 cases of epidemic parotitis were admitted, 8 of which were complicated by appendicitis, an incidence of 0.47 per cent.

Table 8. *Mumps Complicated by Appendicitis.*

Source	Case No.	Age	Sex	Interval between Parotid Swelling and Abdominal Symptoms	Interval between Abdominal Symptoms and Operation	White-Cell Count	Polymorphonuclear Leukocytes	Type of Acute Appendicitis
		yr		days	days		%	
Benassi[35]				5				Perforated, with generalized peritonitis
Sandler and Finne[41]				5		12,150	88	Perforated
Finch[42]				5				Perforated, with abscess
Donnelly and Oldham[43]				7	4			Gangrenous, and perforated
Seelye[44]		6	F	4	0	14,200	76	Gangrenous
Willard Parker Hospital								
	1	12	F	4	1	21,250	90	Gangrenous, with abscess
	2	16	M	6	1	14,000	81	Gangrenous
	3	19	M	10	1	11,000	75	Not stated
	4	12	F	5	3	13,700	81	Gangrenous
	5	14	M	9	0	19,500	82	Gangrenous
	6	7	M	4	1	20,000	79	Gangrenous
	7	9	M	5	1	13,000	81	Gangrenous
	8	5	M	3	1	18,000	92	Gangrenous

Table 8 illustrates the time relation between the onset of parotid swelling, abdominal pain and surgical intervention. Pathological and operative findings are also included. Abdominal pain due to appendicitis occurred from the third to the tenth day after the onset of parotid swelling. In all our cases, the symptoms and physical findings were typical of appendicitis. Whereas in blood studies of uncomplicated mumps the leukocytes may be increased or occasionally decreased with a relative and often an absolute increase in lymphocytes, the cases listed here all showed a leukocytosis with increased polymorphonuclear cells. There were 6 males and 2 females, with the ages varying from five to nineteen years. In practically all the cases the appendix was either gangrenous or already perforated. These findings suggest that the appendix is especially apt to rupture during the course of mumps. In 6 of our cases, surgery was delayed for a period of twenty-four hours, and in 1 case for three days. In 1 case, appendectomy was performed on the same day that abdominal symptoms commenced, but here also an acute gangrenous appendix was found. Because of this tendency toward early gangrene and rup-

ture, it is safest to operate immediately if appendicitis is suspected in a patient with mumps.

The differential diagnosis of abdominal pain in epidemic parotitis rests between oöphoritis, orchitis, pancreatitis and appendicitis. Orchitis, which is more often unilateral than bilateral, usually occurs at the height of parotid swelling. The pain may radiate from the testis to the thighs and hypogastrium. When testicular swelling appears, the diagnosis is obvious. Pancreatitis is rarely seen before puberty. It occurs most commonly one week after parotid swelling, but may also appear before it or as late as three weeks after it. Pain and tenderness over the pancreatic regions, with at times palpable tumor, are the usual physical findings. A blood-amylase determination and elevated fasting blood sugar may clinch the diagnosis. There is difficulty in differentiating oöphoritis from appendicitis. The temperature in the former is usually much higher than in the latter and is accompanied by chills. Localization of tenderness should, of course, be of aid in the diagnosis.

Treatment in our series consisted of appendectomy as soon as the diagnosis was made. General anesthesia was administered. Convalescent mumps serum was not used in any case. There were no additional complications and no deaths.

No investigator has been able to demonstrate that any relation exists between mumps and appendicitis. The theory advanced by Benassi,[45] which is supported by Sandler and Finne,[41] although without any experimental proof, holds that the virus or organism that is present in Stenson's duct migrates to the appendix by way of the blood, lymphatic system or digestive tract. The belief that the organism is present in the blood stream has some support in the known fact that orchitis or pancreatitis may be the first sign of mumps. Rosenow and Dunlap[46] in 1916 reported 8 cases of appendicitis occurring at a school where there were also 34 cases of epidemic parotitis. None of the patients had both diseases. In 4 cases, streptococci cultured from the appendix when inoculated into rabbits gave rise to parotitis. The point was raised whether the appendix and parotid gland had an affinity for the same organism. This view has fallen into disregard since Johnson and Goodpasture[47] showed that mumps is produced by a filterable virus. Wesselhoeft[48] does not believe that appendicitis is due directly to the virus invasion. Because of the low incidence, Sneierson[40] believes that appendicitis is probably a coincidental complication.

The fact that the majority of cases of appendicitis fall between the fourth and seventh days of the contagious disease is highly suggestive of some casual relation between the two.

Pertussis

Among 3064 patients with pertussis, 3 developed acute appendicitis, an incidence of 0.09 per cent. Bullowa et al.[4] reported no cases of appendicitis complicating 1219 patients admitted to this hospital in the five years before our study. Cowie[49] reported 1 case of acute gangrenous appendicitis, occurring in the sixth week.

Our patients were 1 girl, aged six, and 2 boys, aged eight and nine. All cases occurred during the fourth week of the paroxysmal stage. One case was allowed to go on to perforation because the patient was thought to have bronchopneumonia with mesenteric adenitis. The leukocyte counts were, respectively, 15,300 with 73 per cent polymorphonuclear leukocytes; 15,400, with 86 per cent polymorphonuclear leukocytes; and 15,850, with 81 per cent polymorphonuclear leukocytes.

Since the temperature as a rule is elevated only at the onset of pertussis, a rise during the course of the disease has practically the same significance in detecting a complicating appendicitis as it would in a person not suffering from pertussis.

In regard to the leukocyte counts, it has been shown that during the catarrhal stage of pertussis the blood is approximately normal. This is followed by an abrupt leukocytosis with lymphocytosis during the paroxysmal stage. There is a gradual decrease in the number of white cells and in the number and percentage of lymphocytes, with diminution of the clinical signs. The majority of authors seem to think that complicating pyogenic infections do not change the already established pertussis blood picture.[50] Our 3 cases occurred late in the course of the disease, and this may explain the increase in neutrophils.

Rubella

There was 1 case of appendicitis among 816 cases of rubella. This occurred in a ten-year-old boy who developed abdominal pain, nausea and vomiting simultaneously with a rash. The temperature was 102°F. The leukocyte count was 7290, with 80 per cent neutrophils. The postoperative diagnosis was acute suppurative appendicitis.

The blood picture in uncomplicated rubella may be similar to that in measles. Hynes[51] did serial leukocyte counts on 61 patients with rubella. There was an initial leukopenia, with the white-cell count rising to normal by the tenth day. Half the patients had absolute neutropenia until after the tenth day. One third had neutrophilic leukocytosis.

Summary

The records of 29,802 cases of the common contagious diseases were reviewed for the concomitant presence of acute appendicitis, which occurred in 53 cases, an incidence of 0.18 per cent.

One hundred and two cases of acute appendicitis and pseudoappendicitis were analyzed for age, sex, leukocyte count and the time relation between the onset of the appendicitis and the manifestation of the contagious disease.

More than half the cases of acute appendicitis were found to be already ruptured at operation.

It is pointed out that physicians often hesitate to diagnose acute appendicitis in the face of obvious signs because of the presence of a contagious disease, which in its usual course is frequently accompanied by abdominal symptoms.

A review of the literature is made, and some of the reported cases are included in this study.

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MEDICAL PROGRESS

PHYSICAL THERAPY IN SURGICAL PRACTICE*

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THE application of physical therapeutic measures in nearly every field of medicine has usually been reported as an adjunct to other forms of treatment, but at times as the sole form of therapy.[1] Surgeons particularly find that in a variety of conditions these agents are beneficial. At times specialized technics are indicated, and these are best administered by a trained technician under the direction of a physical-therapy physician. For the most part, however, established procedures useful in preoperative and postoperative care can be directed by the surgeon himself. Full information on the physical principles involved, the physiologic effects and the technical details of administration of these physical measures may be found by referring to the standard textbooks on physical medicine.[2-4] Also recommended is an excellent thirty-five-page summary of the most useful measures in general practice, particularly in military hospitals, recently prepared by a group of experts[5] under the auspices of the National Research Council and the Council on Physical Therapy. It is the aim of this paper to report some of those applications of physical medicine that at the present time are being found of value in the treatment of patients hospitalized for common surgical procedures.

PREOPERATIVE APPLICATION

Physical therapy is of value in a limited number of conditions preoperatively. Local applications of heat to areas of superficial infection are frequently utilized, although on rather empirical grounds. Recent studies[6, 7] have shown that increasing or lowering the temperature has only a transient effect on the development of experimental infections. Clinical experience, however, has indicated that hot fomentations and immobilization speed the localization of superficial sepsis and in many cases are beneficial before incision and drainage. Hot, moist compresses extending well beyond the involved area are most commonly used. These may consist in layers of woolen blanket wrung out of water at 160°F. and applied to the skin, which has previously been coated with boric acid ointment or vaseline, the entire dressing being covered with oiled silk or rubber sheeting. Since cooling occurs in about twenty minutes, the entire dressing may be surrounded by a heat cradle to maintain an elevated temperature for more prolonged periods. Cochran[8] has recommended that tubes carrying saline solution be inserted to keep the dressing moist.

Flaxseed poultices or melted paraffin-wax dressings may be used for more retentive heating effects, but are less easily prepared. The Kenny type of hot pack[9, 10] has been found quite effective in surgical conditions[11] as well as in poliomyelitis. This pack consists of all-wool blanket strips that are heated in boiling water and wrung out twice through a tightly adjusted wringer at the bedside, and quickly applied. Higher initial temperatures than otherwise are safe, since the woolen material retains little moisture after wringing, thus minimizing the danger of burning. A further advantage is that after cooling, the pack is only slightly moist and not uncomfortably cold.

Thermal agents are valuable in the immediate treatment of sprains and contusions. Cold rather than heat should be applied during the first twenty-four hours, to prevent excessive hemorrhage and exudate.[12] In some conditions the use of cold is contraindicated. Application of ice bags to the abdominal wall in the presence of peritonitis, appendicitis or bleeding peptic ulcer may be deleterious because of the possible stimulating effect on peristalsis,[13] the impediment to diagnosis from the local anesthetic action and the possible injury to the skin that may later be the site of operation.

Therapeutic exercises are of value before some surgical procedures. Individual muscle training prior to certain types of arthroplasties and tendon transplants may facilitate greater function postoperatively. Before thoracoplasties, shoulder and upper-back exercises should be learned so that the confidence of the patient in the technician and his familiarity with the required movements will make it easier to start exercises after operation.

Abdominal exercises as described by Coulter[14] have been recommended before the repair of hernias by some surgeons.

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In preparation for extensive abdominal surgery, ultraviolet irradiation in mild tonic dosages may improve the general condition of somewhat debilitated patients.[15] Several daily irradiations with the production of mild erythema may also speed healing of pyogenic skin infections or acne vulgaris in the operative region.

Postoperative Application

To secure maximum comfort for patients postoperatively, attention should be given to correct bed posture, both lying and sitting. During the period of recovery from anesthesia the optimum position must of course depend on the type of anesthesia and the site and nature of the operation. Later during convalescence backache and pains referable to muscles may be due to mechanical strain, and are preventable by applying the principles of correct posture.

If the surgical condition permits, the proper recumbent position is the same as the normal standing alignment. Tight bedcovers are uncomfortable and tend to cause foot-drop and knee-flexion contractures in patients who remain supine nearly continuously. A footboard easily remedies this difficulty. When the patient is sitting in bed, pillows should be placed to support the upper back and prevent acute angulation of the neck with compression of the thorax. Postural instruction should also include correct chair-sitting and standing alignment when that stage of convalescence is reached. A well-illustrated presentation of posture in nursing care that has recently been published elucidates these important points more fully.[16]

It is well known that the inactivity necessitated by some operations results in loss of muscle tone and bulk, with alterations in circulation since the normal lymphatic and venous return is dependent on muscular activity. Massage, although not capable of preventing the muscular atrophy of disuse, improves tonus. It has a more important effect on circulation, for in addition to the reflex dilatation of the capillaries obtained by light stroking, heavier motions and kneading improve the venous and lymphatic return.[17]

Massage also has definite effects on the central nervous system, although the pathways involved are not known. Muscular and psychologic relaxation may be produced by slow, gentle, rhythmical stroking. This sedative action of massage may be used to secure sleep without the aid of drugs, as well as for its comforting effect. Well-trained nurses are expected to have developed sufficient skill to accomplish this. In the presence of pathologic conditions such as fractures and paralyses, specially trained technicians are more effective. General massage may be used for its tonic effect, and although not resulting in an accumulation of lactic acid and other metabolites of muscular activity, it is similar to mild exercise and may be followed by a sense of fatigue.

Since muscular atrophy occurs rapidly and extensively with inactivity,[18] it should be counteracted as soon as the general condition permits by muscular contractions graded in intensity. At first the exercise may consist of muscle-setting only, then free motions increasing in difficulty or in frequency of repetition. This exercise, in addition to maintaining and improving muscular strength, thus shortening convalescence, is also thought to be of value in preventing thrombophlebitis. Krebs[19] has recently advocated the use of a recumbent bicycle apparatus attached to the bed to lessen the occurrence of this familiar postoperative complication.

Another complication of bed rest in elderly patients and those with some degree of arthritis is the development of painful contracted shoulders. A simple precautionary measure is to instruct or aid the patient to abduct the arm fully and rotate it externally several times daily. In the presence of pain, local heat from a luminous heat lamp or hot packs applied for twenty minutes preceding the exercises may be of benefit.

Special Application

The measures already described are of general usefulness. In addition, there are procedures that may be indicated in relation to surgery of particular regions of the body.

Abdominal Surgery

The treatment of distention, ileus and peritonitis is not within the scope of this report. Some form of local heat is frequently recommended, however, and for this purpose a simple heat cradle or "baker" containing incandescent electric-light bulbs is effective and avoids abdominal pressure.

To reduce the inflammatory reaction and edema of the stoma following a Mikulicz type of colonic resection, Welch and Krusen[20] devised a special applicator for internal heating. This consists of a two-way rubber tube, which is inserted in the colon and through which a current of hot water is circulated at known temperature and pressure as regulated by the Elliott-treatment machine. These authors have found that a few such treatments allow earlier progression to the second stage of the operation.

Genitourinary Surgery

Measures designed to produce hyperemia are frequently recommended as adjuncts to other forms of treatment of pelvic inflammatory disease.

Agents employing conductive heating through the abdominal wall, such as hot-water bottles, may give some temporary relief of pain, but the intra-abdominal temperature is not altered. For deeper heating and more lasting effect, short-wave diathermy may be applied to the abdominal wall.[21] The maximum heating effect is obtained by the use of vaginal electrodes with short-wave or preferably long-wave diathermy machines.[22] Similar devices for intrapelvic heating include Elliott treatments with circulated hot water,[23] methods using hot air[24] and, more recently, a small incandescent bulb of appropriate shape with filament temperatures that can be regulated as desired.[25] Hyperemia may also be accomplished through iontophoresis with acetyl-beta-methylcholine, and successful reduction of inflammation has been reported by several authors using this method.[26, 27] Since these treatments are nonspecific, it is obvious that the simplest and safest available method that gives relief should be used.

Orthopedic and Traumatic Surgery

Physical therapy is indicated to speed restoration of motion postoperatively in the majority of patients who require bone and joint surgery. In the treatment of fractures and of traumatized skin, muscles, tendons and nerves, physical measures also play an important role. In these cases a combination of agents is most effective. Heat is required for its beneficial effect on the circulation and to relieve spasm of muscles. This is generally followed by massage of a specific type, depending on its intended purpose. At times only gentle stroking is used for reflex circulatory effect; later, deep motions are employed for mechanical relief of excessive exudate, and in some types of cases friction is used to loosen contractures. If there is spasticity of muscles, as in spinal-cord or cerebral injuries, the massage must be of a sedative type, with avoidance of stimulation of the hyperactive reflexes.[28] Active therapeutic exercises generally follow the primary passive procedures. These must usually be carefully supervised at first, to teach patients the correct use of weak muscles and to avoid substitution of strong muscles for weaker ones. The amount of exercise is also carefully adjusted to strength and progress. In an occasional case when relatively prolonged immobilization is required, the muscular atrophy may be successfully combated by stimulation with faradic or sinusoidal currents.[29]

For optimum results from physical therapy for diseased or traumatized tissues, it is important that a well-trained technician administer the treatment, under supervision by a physician who understands the principles and technics involved. Detailed discussion of the methods of physical medicine as required in traumatic surgery is so specialized, however, that it must be made the subject of a separate report.

Hand Surgery

Speedy recovery from diseases or injuries of the hand is of such importance during this period of manpower shortage that the role of physical medicine in the treatment of hands should be familiar to all surgeons called on to treat these cases. It is particularly necessary that a physical-therapy or occupational-therapy technician be given specific instructions concerning the pathologic condition present, the purpose of the treatment, what results are to be expected and the exact measures to be used. There is no place for orders such as "baking, massage and exercises." If the surgeon himself is not familiar enough with physical medicine to write an intelligent prescription, he should refer the case to a physician specializing in this work to obtain optimum results.

In the treatment of superficial injuries such as abrasions, burns and infections, rest is one of the best therapeutic agents. Correct splinting is of great importance to prevent as much as possible the interference with function of muscles and joints that always results from immobilization. Marble[30] has emphasized this point and has indicated the correct position for splinting various injuries to the hand. In the case of infection, heat in the form of a large fomentation is probably of benefit, and such an application acts also as a form of immobilization. Moist compresses as previously described may be used. An approved and safe electrically heated compress (the Cooley compress) has been produced by which a constant temperature can be maintained by an accurate thermoregulator. Thermometers are incorporated as an added precaution.

Since the use of chemotherapy became widespread, there has been a real danger of beginning exercises too early in these cases because of the absence of febrile reaction as a guide to the disease process. During the early mobilization period treatments should be carefully and frequently supervised by a physician, and not left entirely to the judgment of a technician or the patient himself. The arm whirlpool bath is an excellent means of supplying heat to improve circulation, and at the same time the mild massaging effect acts as an additional stimulus to the capillaries, has a sedative action on painful areas, and enables active motions, such as grasping a sponge, to be started under water. In some cases manual massage may be helpful when edema is prominent. Gentle stroking motions only are to be used. Later in cases of beginning contracture from scar tissue,

the deeper friction type of massage is indicated. Since the hand is such a complicated mechanical structure, exercises intended to improve function should almost always be active, and in many cases are best executed in the form of functional occupational therapy. Work requiring graded amounts of joint motion, muscle strength and skill may be prescribed. In addition to the improvement of hand function thus obtained, the patient himself is benefited psychologically.

Physical therapy for burn contractures should usually be begun only after surface healing is complete, particularly if there have been skin grafts.[31] Gentle active exercises may be begun in a warm (104 to 106°F.) whirlpool bath. This is followed by massage, chiefly at the junction of normal and involved skin, to loosen contractures. Later, when there is firm scar tissue, melted paraffin wax baths for twenty minutes may precede the massage. In all cases active graded exercises and instruction in use of the hand follow the passive procedures. Tension splinting may be required in some cases, but the apparatus should be removed once or twice daily for treatment to prevent joint stiffness and loosen scar tissue. In these cases it must be recognized that no amount of physical therapy will make up for an absence of normal tissue, and treatments should be discontinued when the maximum benefit has been secured.

In the presence of nerve injury, physical therapy aims to prevent excessive muscular atrophy and to speed the regeneration of muscular contractions when the nerve has regenerated. Mild heat, gentle passive motions and electrical stimulation of muscles have been found to be of value for this purpose.[28]

In the aftercare of sutured tendons, Mason[32] has shown that gentle limited active motion may be begun in a splint at the end of the second week with safety and benefit. After four weeks, free active motion is safe, but strenuous activity should not be permitted before the end of six weeks.

It is generally believed that physical therapy will not prevent or cure Dupuytren's contracture.[33] After surgical excision of the palmar fascia, however, certain procedures are of definite value. Motion should not be allowed until the skin wound or graft site is healed, or for about two weeks. Radiant heat may be applied during this period, but no more than mild finger exercises. Later on, splintage in some cases with mild tension in extension, together with daily physical therapy, is recommended. The whirlpool bath is excellent for this purpose and is followed by graded active exercises. In my experience physical therapy may be continued for months with benefit, as evidenced by increasing function. Some patients develop marked swelling of the phalangeal joints with tenderness and limited motion postoperatively, which persists as long as nine or ten months and clinically resembles rheumatoid arthritis in appearance. The etiologic factor is not clear. Since Dupuytren's contractures are commonly found in patients with rheumatoid arthritis of the hands, there may be an etiologic relation, the trauma of operation precipitating the arthritis. Another possibility is ischemia from prolonged use of a tourniquet during operation.

Crushing injuries to the dorsum of the hand by direct blows or pressure from clothes wringers may be extremely disabling if not treated properly.[34] The skin is usually not greatly injured primarily, but if excessive subfascial hemorrhage and exudate are allowed to develop, the skin may later become necrotic and will have to be replaced by grafts. The immediate application of pressure dressing, with elevation maintained for several days or longer, has been found effective in preventing this skin necrosis. Mobilization is begun when the tendency to hemorrhage and edema formation has been overcome. The whirlpool bath is employed and is followed by supervised active exercises, with great caution in allowing free active use, since only moderate exertion, particularly in activities such as wringing clothes by hand, may precipitate fresh hemorrhage.

Much has been written concerning Volkmann's ischemic contracture. As function may be greatly diminished in spite of all physical therapeutic efforts, prevention and immediate relief seem the only satisfactory methods of overcoming this condition.[35] The physical-therapy procedures of value have been described in detail by Meyerding and Krusen.[36] They consist in traction splinting, heat, massage, manipulation, exercises and occupational therapy.

Thoracic Surgery

Prevention and correction of scoliosis are problems complicating open drainage for pulmonary abscess and after thoracoplasty. The preoperative use of exercises has already been recommended. Bisgard[37] in his studies of the development of scoliosis in these cases has advised postural wedging. The patient lies on the affected side over a rolled pillow so placed as to act as a fulcrum, correcting the tendency to lateral deviation. In the postoperative care of thoracoplasties, sandbags may be used to further collapse.[38] Postural motions are indicated as soon as the local and general conditions permit, to develop muscular control, thus overcoming the tendency to shoulder-joint limitation and spinal deviation. These exercises are gradually increased in intensity and continued until the patient can stand and walk with

no deformity. The precaution of regulating the exercises should always be taken so that dyspnea and a rapid pulse rate are avoided.

When convalescence is complicated by draining sinuses, healing is occasionally speeded by local ultraviolet irradiation. For this purpose special quartz-rod applicators are available for use on the water-cooled or the newest type of air-cooled mercury-arc lamps and the so-called "cold quartz lamps."

Occupational Therapy

A number of patients require a long period of convalescence following operation, and special additional measures may be helpful in rehabilitation. Diversional or recreational activity supervised by a well-trained occupational therapist may be of value in obtaining emotional control and a proper mental outlook.

Functional occupational therapy that aims at the restoration of a particular joint motion or of muscular strength and skill is of much wider usefulness than the above. This is particularly true in treating industrial or war injuries, for recovery means, in addition to primary wound healing, the optimum return of function so that former activities can be continued whenever possible. Occupational therapy can frequently be combined with physical therapy with synergistic effect. For proper correlation of treatments these two forms of therapy function best when under the direction of a physician specializing in this type of work.[39]

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 29171

PRESENTATION OF CASE

A sixty-year-old married grocer entered the hospital because of a painful mass in the upper abdomen.

The patient had been in good health until five weeks prior to admission when he fell and struck his left side against the sharp edge of a box. He had no immediate pain but several days later developed a severe "toothachy" pain just under the left costal margin near the midline and felt an extremely tender "lump" in that area. After several osteopathic treatments the pain and tenderness were relieved but the mass persisted. Approximately four weeks before admission he began to suffer with a dull, dragging, nonradiating pain in the epigastrium that usually occurred every day and generally lasted one-half to two hours. This was unassociated with meals or any food indiscretion but was aggravated by lifting. Later the pain spread over the upper abdomen and to the right upper quadrant, where it became localized. Three weeks before admission he had two episodes of acute indigestion characterized by gripping abdominal cramps and nausea and on one occasion he vomited. Ten days before admission his physician prescribed Schlesinger's solution (scopolamine, morphine and Dionin) for the pain but this seemed to aggravate the symptoms. Prior to admission he developed constipation; the occasional stool was meager and yellow. The patient had lost 15 pounds in the period of illness. There was no history of diarrhea, jaundice, general malaise or tarry or bloody stools.

The family and past histories were noncontributory. The patient had been married thirty-one years, but there had been no children.

Physical examination disclosed a well-developed and fairly well-nourished pale man who appeared chronically ill. The chest was slightly hyperresonant. There were showers of fine crackling rales at the end of inspiration over the entire posterior chest, which seemed to disappear after coughing. The heart was normal. The upper abdomen was filled with an extremely firm, resistant mass with a well-defined nodular edge that descended with respirations. The palpable nodules varied considerably in size up to approximately 3 cm. One area of the mass, just above the umbilicus, was tender.

The blood pressure was 150 systolic, 80 diastolic. The temperature, pulse and respirations were normal.

Examination of the blood revealed a red-cell count of 4,600,000 with a hemoglobin of 13.8 gm. The urine was acid in reaction and had a specific gravity of 1.018, and the sediment contained 15 white cells and many bacteria per high-power field. The blood Hinton test was positive on two occasions, and one Wassermann test was positive.

A barium meal showed "curling" in the lower third of the esophagus. There was evidence of extrinsic pressure on the anterior surface and the lesser curvature of the body of the stomach. The spleen appeared to be at the upper limit of normal. At the end of six hours the barium was in the terminal ileum and proximal colon. A barium enema revealed an annular irregular defect in the midsigmoid that was 7 cm. in length. Because of partial obstruction at this point the colon could not be completely examined. On account of the positive Hinton test the patient was treated with potassium iodide and bismuth, but without effect on the upper abdominal mass.

The patient was discharged unimproved a week after admission.

He led a semi-invalid existence but was able to get about satisfactorily. Two and a half months later his abdomen began to swell and later his ankles became swollen. Jaundice developed and he felt extremely weak. He seemed to have a great deal of respiratory difficulty, and finally died approximately three months after the hospital admission.

DIFFERENTIAL DIAGNOSIS

DR. J. H. MEANS: We had better get all we can from Dr. Holmes first.

DR. GEORGE W. HOLMES: This first film shows the mass in the right upper abdomen. It fills the whole upper abdomen and through it you can see the shadows of the kidneys, which are normal so far as size and shape go. There is no evidence that the spleen is enlarged. I cannot see it. The diaphragm is rather high on the right. My bet would be that the mass is an enlarged liver. There is some delay in the barium as it goes from the esophagus to the stomach and one might say that the patient has a small hiatus hernia. I do not see any evidence of varices.

DR. MEANS: Is it fair for me to ask whether an enlarged liver would exert extrinsic pressure

on the esophagus and cause such a picture as that?

DR. HOLMES: I do not think it would. In any old person you could get a picture like this.

The displacement of the stomach is shown in this film, and the mass still looks like a large liver.

DR. MEANS: There is nothing wrong with the gastrointestinal tract down as far as the small bowel except that the stomach is squeezed in the front by this big mass.

DR. HOLMES: There is narrowing of the colon at a point that is hidden in this view by a loop of bowel, but on turning the patient in the lateral position it can be seen. In the ordinary position it is hidden by the rectum and lower sigmoid. In this plate, taken after evacuation, there does not seem to be any great amount of obstruction to the passage of the barium into the colon. The report says there was obstruction.

DR. MEANS: There is nothing wrong with the sigmoid?

DR. HOLMES: The spot films were taken to demonstrate the details in this constricted area.

DR. MEANS: Did you ever see such narrowing as this as a result of an inflammatory process that went with diverticulosis?

DR. HOLMES: Yes; it could be that. There is nothing very characteristic about this narrowing. It could be due to either neoplasm or an inflammatory lesion. I should like to be able to say whether it is intrinsic or extrinsic, but I am not certain about that.

DR. MEANS: It may not be intrinsic?

DR. HOLMES: No.

DR. MEANS: It may be external pressure on the bowel?

DR. HOLMES: Yes; but I think it is an intrinsic lesion that has not destroyed the mucosa to the extent that one would expect a neoplasm to do. In addition, it covers a larger area than a neoplasm ordinarily does. I think I should favor an inflammatory rather than a neoplastic process.

DR. MEANS: No chest plate was taken?

DR. HOLMES: We have some films that cover the lower part of the chest.

DR. MEANS: You do not see any metastatic lesions?

DR. HOLMES: No.

DR. MEANS: Is there anything wrong with the bones?

DR. HOLMES: No. I wish I could go farther on this film. There is one part of this area where I can see a fingerprint-like shadow that does look like tumor.

DR. MEANS: Where is it?

DR. HOLMES: In the sigmoid. Here is another set of films covering the same area in which I do not see it; the mucosa is fairly normal.

DR. MEANS: I think that the differential diagnosis here can be approached best by trying to solve the following questions: What is the hepatic lesion? What is the colonic lesion? Are they related one to the other? and, Have they anything to do with the positive Hinton test? If there is doubt about the nature of the lesion in the sigmoid and if it were my case I should want to have a sigmoidoscopy done. It seems queer that it was not done.

DR. TRACY B. MALLORY: The lesion was thought to be too high for that.

DR. MEANS: Is it too high to reach with a sigmoidoscope?

DR. HOLMES: I should think so.

DR. MEANS: Still, there might have been lesions lower down that they could have picked up. I think the examination was indicated. I should like to know more about the chest because of the rales and I am interested in whether there were any metastases in the chest. Dr. Holmes says there were none in the bones—at least in the ones he saw.

First of all, I think it is fair to assume that this large mass in the upper abdomen was the liver. What else could it have been? It was not spleen because we have been told that the spleen was not enlarged. It was not kidney, since we have also been told that the kidneys were not enlarged. I do not see how it could have been pancreas. It does not sound like any pancreatic lesion that I know of. It had an edge, and the only organs that have an edge are spleen and liver. Also it moved down with respiration. It seems to me that there is no doubt that the mass was a big liver; in addition, the edge was very nodular, having nodules up to 3 cm. in diameter, which were hard. The relation of the injury to this we might take up. It is not at all uncommon for a person to have a large mass of some sort in the abdomen about which he knows nothing; it produces no constitutional symptoms and is first discovered after he has injured it. I think in this case the patient may have bruised this mass and have had a hematoma or something of that sort in it. The story as we get it is that he had symptoms of some difficulty on bending over, which were aggravated by lifting. The symptoms that go with a large abdominal mass may be related to posture. The complaint is made that it is painful to bend over; sometimes position makes a definite change in the pain.

I am interested in the constipation. It says that this occurred "prior to admission." Of course we

should like to know how long ago. Whenever anyone in old age develops progressive constipation one thinks at once of the possibility of a malignant lesion in the colon, and this x-ray picture could, of course, represent a malignant lesion in the colon.

We then come to the positive Hinton test. The patient must have had syphilis at some time in the past. Could the lesion in the liver have been syphilitic? He had positive Hinton and Wassermann tests, which is of great importance. We know that they gave him some antisyphilitic treatment, which is said to have been without effect on the upper abdominal mass. I should like to know how vigorously this treatment was pushed.

DR. EARLE M. CHAPMAN: The patient was in the hospital a week. On the last day he received bismuth and, a few days before, potassium iodide. This treatment was continued when he went home. The mass became smaller over the first three or four weeks of treatment, and the patient felt better.

DR. MEANS: Now we are in a dilemma. However, I think the man had one of two things. A liver with lumps in it as big as these are said to have been can only be explainable by cancer or syphilis. I do not believe that a syphilitic liver would give lumps that could be felt as easily as this. There is a condition called hepar lobatum, in which the liver is broken into subdivisions that can be felt perhaps as nodules. The patient could have had syphilis of the liver and a lesion in the bowel that was not carcinomatous. I do not know of regional inflammation of the colon of the sort one sees in the ileum. I do not believe the lesion is tuberculous. Dr. Holmes says that this lesion might not have been intrinsic.

DR. HOLMES: I think it is.

DR. MEANS: I am going to assume it is, because I should be in a worse hole if it was not. It might have been due to chronic diverticulosis. If that were the case, I do not see why the patient did not have a past history of colonic symptoms, which apparently he did not have, beyond a little constipation.

I think I shall wind this up by saying, first, that the patient had cancer of the sigmoid, which had metastasized extensively to the liver. I believe he had syphilis, but the syphilis did not play a part in the symptomatology. On the other hand the fact that he got better on antisyphilitic treatment is disconcerting and makes one wonder if it could have been a syphilitic liver. If it was a syphilitic liver I do not see why he did not keep on getting better on antisyphilitic treatment. I suppose he could have had cancer in the bowel and syphilis in the liver, but that is most unlikely. But I am going to admit that the liver could have been syphilitic and that the lesion in the colon could have been a benign one.

DR. MALLORY: I should like to ask Dr. Holmes a question. Could the lesion in the sigmoid be lymphogranuloma venereum?

DR. HOLMES: Yes; I think that is possible.

DR. MALLORY: Lymphogranuloma could give local involvement of the colon and might, of course, be associated with syphilis.

CLINICAL DIAGNOSES

Hepar lobatum.
Syphilis.
Carcinoma of sigmoid, with massive metastases?

DR. MEANS'S DIAGNOSES

Carcinoma of sigmoid, with metastases to liver.
Latent syphilis.

ANATOMICAL DIAGNOSES

Carcinoma of sigmoid, with metastases to regional nodes and liver.
Arteriosclerosis, aortic, severe.
Icterus.
Ascites.
Pulmonary tuberculosis, healed, apical.
Serologic syphilis.

PATHOLOGICAL DISCUSSION

DR. MALLORY: The post-mortem examination showed that the patient did have a cancer of the sigmoid; the liver weighed 5000 gm. and was almost completely replaced by metastatic tumor. There was no evidence of syphilis that we could discover at the autopsy. The lungs showed healed apical tuberculosis but no metastases.

DR. CHAPMAN: Our reasoning was very much the same as that of Dr. Means in approaching this problem. We thought that it was probably cancer but that the patient's only hope was for us to act as if it was related to syphilis. For that reason Dr. Francis R. Dieuaide saw him and raised an instructive point. Here was a man of sixty who was suddenly discovered to have positive serologic tests for syphilis. After much pressure we obtained from him a story that he had acquired a primary lesion five years before coming to the hospital. He had had no specific treatment. This represented untreated syphilis of five years' duration and Dr. Dieuaide pointed out that this was just about the right interval for the appearance of a gummatous lesion, a hepar lobatum in the liver. So we treated him on that basis. The intestinal lesion was too high to view with a sigmoidoscope, and we did not try it. The improvement following the first

four injections of bismuth was striking. The patient felt better and went back to work. The lumpy mass definitely decreased in size and was less tender. After he had had six or seven injections of bismuth, the nodules began to increase, the pain returned and he went into a progressive downhill course.

DR. MEANS: Did you find any evidence of trauma in the liver that might have been the result of accident — hematoma or anything of that sort? Have you any explanation for the diminution in size after the antisyphilitic treatment?

DR. MALLORY: No; we could find no evidence of syphilis. Regarding the improvement, I am reminded of the old story attributed to Dr. Osler. The question was, "What could put 50 pounds on a man with cancer of the stomach?" And the answer was, "An optimistic consultant."

CASE 29172

PRESENTATION OF CASE

First admission. A twenty-one-year-old housewife was sent to the hospital because of a rash that first appeared on the face but that more recently had spread to the arms, legs and oral mucous membranes.

At the age of nine years following a severe sunburn, the patient developed scarlet, slightly raised areas of skin eruption over the cheeks and bridge of the nose that did not itch or burn. Two months later similar small areas of eruption developed on the chin and the left forehead. Behind the ear there was a 1-cm. area of alopecia. Follicular plugging and gaping of the sweat pores was evident on the upper lip. Some of the older lesions on the chin became scaly and scarred but the lesions remained rather constant until two years before admission, when they almost completely cleared after treatment with aluminum acetate and sodium bicarbonate compresses. However, two small areas on the chin persisted as pigmented spots.

Approximately two months before entry, one month after becoming pregnant, scaling "blotches" appeared on the face without any associated pain, itching or burning, and the patient noted raised, very sore nodular areas on the roof of the mouth that felt like "blisters." At about this time she noticed slight swelling at the base of the fingernails of the left third and fourth fingers associated with local pain and burning. The skin at these points was smooth and shiny. Soon the entire fingertips became red, hard and scaly and small pink spots appeared on the hands. These later increased in size to 1.5 cm. and developed scarlet centers, and scaling brown rings about them. Occasionally these areas burned and itched, and sometimes they were painful. Three weeks before admission similar changes developed on the extensor surfaces of the arms, feet and lower legs. She had recently suffered with occasional mild attacks of occipital headache, which lasted two or three days. During the two days prior to admission her hands and feet seemed swollen.

The patient's mother suffered with syphilitic aortitis. As a child the patient had measles, mumps, scarlet fever, chicken pox and whooping cough without sequelae. There was no history of rheumatic fever.

Physical examination revealed a young woman who did not appear to have any discomfort. There were irregular "blotchy" groups of lesions on the face that were more marked on the cheeks and chin than on the forehead. The lesions were irregularly shaped, purple-red in color, slightly raised and moderately rough. There was a fine scaling of the skin at the tip of the nose. There were a few indurated brownish round "spots" on the chin and at the corners of the mouth and on the arms, hands, legs and feet. Many lesions were round, approximately 2 to 4 cm. in diameter, and had a scarlet scaly center and a brownish ring about the periphery. There were a few small lesions on the chest. An indurated red swelling was present at the base of each fingernail. There was marked redness of the tips of the left second, third and fourth fingers with cracking and scaling of the skin. The upper palate was red and covered with small blisters. Scattered coarse rales were audible posteriorly at the apex of the right lung, and there was a soft systolic murmur in the left parasternal area.

The blood pressure was 130 systolic, 74 diastolic. The temperature was 98.6°F., the pulse 83, and the respirations 20.

Examination of the blood revealed a red-cell count of 4,610,000, with a hemoglobin of 85 per cent, and a white-cell count of 4600 with 66 per cent neutrophils, 26 per cent lymphocytes, 5 per cent monocytes, 2 per cent eosinophils and 1 per cent basophils. The urine was normal. The Hinton test was negative. A Friedman rabbit test indicated pregnancy.

In the x-ray film of the chest the lung fields and costophrenic angles were clear. The diaphragm was normal in position. There appeared to be rather indefinite enlargement of both hilar regions. The heart shadow was normal in size and shape. A gastrointestinal series and Graham test were negative. X-ray films of the sinuses showed a large polyp in one of the antrums along the medial wall and small polyps along the

floor of the antrum. The ethmoid sinuses showed no abnormality. Biopsies of the skin of the leg and arm were consistent with lupus erythematosus. The patient was treated with topical compresses and discharged two weeks later only slightly improved.

Second admission (one month later). The patient was readmitted because of a red, tender, painful swelling of the right ankle that appeared a day after leaving the hospital and gradually resulted in stiffness of the joint. The eruptions on the hands had cleared slightly, but those on the legs and feet were somewhat worse. The lesions elsewhere were unchanged. Dermatographia of the trunk was striking. There was a tender, warm, reddish swelling of the right ankle, where several of the skin lesions appeared to be secondarily infected. The fundus of the uterus was felt four fingerbreadths above the symphysis pubis.

The temperature was 100°F., the pulse 93, and the respirations 20.

Examination of the blood revealed a red-cell count of 4,070,000, with a hemoglobin of 80 per cent, and a white-cell count of 3900, with 58 per cent neutrophils, 36 per cent lymphocytes and 6 per cent monocytes.

Two days after admission, soreness and stiffness developed in the elbows, the shoulders and the right knee and ankle, and the right knee was slightly swollen along the medial aspect of the patella. The swelling of the right ankle had improved following treatment with compresses of 1 per cent chlorinated soda. Oil of wintergreen applied topically made the painful joints more comfortable, but two and a half weeks later, swelling and stiffness spread to the joints of the hand and the left elbow. An infected excoriation developed on the right buttock, and following an extension of the pustular lesions on the right foot, tender, fluctuant adenopathy developed in the right groin associated with pain, tenderness and rigidity in the right lower quadrant that necessitated open drainage. Because beta-hemolytic streptococci were cultured from the pus and a few petechiae occurred beneath the beds of the fingernails the patient was started on orally administered Prontylin (10 gr., three times a day). The temperature, which had been spiking to 102.5°F. each day, became normal and the patient seemed markedly improved. Forty-four days later, after having received 795 gr. of Prontylin, she complained of headaches and severe dizziness, which disappeared when the drug was withdrawn and promptly returned when it was used again after a rest period of three days. Approximately three weeks later, because the right groin wound continued to show a positive culture for beta-hemolytic streptococci, the patient was started on daily doses of 10 cc. of Prontosil intramuscularly; after three days the initial dosage of Prontylin was again tried but this was discontinued after six days of persistent vomiting. The patient continued unchanged, and six and a half months after admission, because of the onset of labor, she was transferred to a lying-in hospital for delivery.

Third admission (ten days later). The patient was readmitted because of continued suppuration in the right groin. Labor had proceeded uneventfully under Pentobarbital and scopolamine analgesia, with drop ether anesthesia at the time of delivery, and the patient was delivered twenty-three hours later. The fetal heart remained good until two hours before delivery but then was lost. At birth, the stillborn infant was covered with bright golden-yellow vernix caseosa. Post-mortem examination showed this material in the bronchi, trachea and stomach, and petechial hemorrhages in the epicardium and pleura. On the third day after delivery, the mother's temperature was 102.6°F. and she continued to run a low-grade evening fever to the day of discharge.

On admission the temperature was 101°F., the pulse 100, and the respirations 20.

The red-cell count was 4,000,000, with a hemoglobin of 65 per cent, and the white-cell count 17,450, with 66 per cent neutrophils, 22 per cent lymphocytes and 12 per cent monocytes.

Many of the skin lesions seemed scarred and pigmented. The infection in the right groin was treated with compresses and gradually improved. The patient was discharged a month later somewhat improved.

Fourth admission (five and a half years later). The patient, then twenty-seven years old, was readmitted because of extreme fatigue and chills and fever. Two and a half years before re-entry she began to have vague muscular pains in the chest, neck, back, arms and hands, particularly associated with movement, and these gradually became quite severe. However, there was no apparent associated joint pain. One and a half years before re-entry, after having five teeth extracted, a chin lesion, the site of mild activity, cleared up and she felt quite well. Three weeks before re-entry she began to feel exhausted after only mild daily exertion. Frontal headaches that radiated to the occipital region developed and became progressively worse. However, acetylsalicylic acid always provided some relief. Two weeks before re-entry, she had a "stiff neck" with an area of soreness on the right side below the hairline, from which pain radiated to the right shoulder when she turned her head to the left. This was partially

relieved by acetylsalicylic acid ointment. Three days before re-entry she had a nosebleed after blowing her nose. That night she was awakened by a shaking chill and found that her temperature was 102°F. After a drenching sweat the temperature became normal. Approximately eighteen hours later, she had "chilly sensations" running up and down her spine, which were partly relieved by acetylsalicylic acid. She awakened three hours later feeling warm and perspiring, and all the muscles seemed to ache. During the two weeks prior to admission she had lost 12 pounds.

Recently, the patient had noticed evening ankle edema after she had been on her feet all day. During the past year she recalled having twice passed blood clots "as big as a fist" during a menstrual period.

On examination, the patient appeared tired and apathetic. She complained of a frontal headache and pain in the neck and shoulder. The skin lesions were scarlet and pigmented. There were small, fairly firm, tender, movable lymph nodes in both posterior cervical triangles. The heart, lungs and abdomen were normal. All tendon reflexes were sluggish, especially at the knees and ankles.

The blood pressure was 184 systolic, 108 diastolic. The temperature was 101.4°F., the pulse 110, and the respirations 21.

The red-cell count was 4,560,000, with a hemoglobin of 10.9 gm. per 100 cc., and the white-cell count 5000, with 74 per cent neutrophils, 20 per cent lymphocytes, 2 per cent monocytes, 3 per cent eosinophils and 1 per cent basophils. The urine was alkaline in reaction, had a specific gravity of 1.014, and showed a +++ test for albumin and a ++ Sulkowitch test for urinary calcium; the sediment contained 2 white cells per high-power field. When checked four days later, the urine was acid in reaction and contained no albumin. A phenolsulfonephthalein test showed 35, 20 and 10 per cent excretion of the dye in fifteen, thirty and ninety minutes respectively.

The patient gradually improved on symptomatic treatment and was discharged one week later.

Final admission (twelve days later). The patient was followed in the Out Patient Department, where she complained only of headaches that were relieved by acetylsalicylic acid. She was brought to the accident room in coma. Because it was feared she had taken a massive overdose of barbiturate sedative, oxygen was administered and picrotoxin was injected intravenously. She died fifteen minutes after reaching the hospital.

Differential Diagnosis

Dr. Jacob Lerman: A diagnosis of lupus erythematosus was made on the first admission, and certainly everything I have read so far is consistent with this diagnosis.

This is a long and complicated case and instead of the usual procedure of discussing the differential diagnosis, I shall accept the above diagnosis, and see if I can rule in or out any other diagnosis as the case develops.

On the first admission the only atypical feature, if it was disseminated lupus erythematosus, was the duration of the disease, starting at nine, with a fairly typical onset following sunburn, and lasting until she was twenty-seven. I had one patient who lived eight years, which is fairly long. Most of these patients die between one and six years after onset. The lesions are quite characteristic — their color, the involvement of the face, fingernails and mouth, the leukopenia and the joint pains all fit in with the diagnosis of lupus. Finally a biopsy specimen is said to have been consistent with this diagnosis.

The statement about syphilitic aortitis in the mother raises the question of congenital syphilis in the patient. There is no evidence of any bone lesion suggestive of congenital syphilis, or of eye symptoms; and the description of the rash is not that of syphilis. Finally the Hinton test was negative. I believe we can rule out congenital syphilis.

At this point in the description there is no mention of involvement of other serous surfaces, such as the pericardium, pleura and peritoneum.

On the second admission the second atypical feature appeared — the development of a red ankle. Many patients with lupus erythematosus have joint pains. It is a very frequent symptom but I do not recall having seen an acute joint of this sort. The evidence of infection of the adjacent skin might explain the acutely infected joint. Subsequently, the patient developed the arthralgia and joint stiffness that are characteristic of lupus erythematosus. Then, the complication of suppuration in the groin, from which she suffered throughout and after pregnancy, confuses the picture.

On the third admission I cannot relate the death of the fetus and the description of the vernix caseosa with the patient's condition. I asked an obstetrician what a golden-yellow vernix caseosa signified and he said that it indicated erythroblastosis foetalis. Even if this child did have erythroblastosis foetalis I do not see any connection between it and the patient's complaints. Obviously the child died of intrauterine asphyxiation, and the findings are characteristic. We may pass this off without any further comment.

The fourth admission introduces a new group of symptoms, namely, frontal headaches, which radiated to the occiput, stiff neck, nosebleed, fever,

chills, weight loss, ankle edema, and menorrhagia on several occasions. These symptoms are consistent with lupus erythematosus, particularly the nosebleeds and the menorrhagia. This bleeding tendency raises the suspicion that some of the other symptoms were due to bleeding. The headaches could have been due to intracranial bleeding. She also developed cervical adenopathy, which is common in lupus erythematosus. Another interesting finding is the elevation in blood pressure. On the first admission the blood pressure was normal. Some patients develop hypertension because lupus erythematosus is a generalized vascular disease. Many eventually develop vascular nephritis. This patient had transient albuminuria. Renal injury is characteristic of lupus erythematosus. The importance of renal injury is that when a patient develops it, the prognosis becomes poor. From that point on the patient usually goes downhill very fast. Throughout the course we find evidence of leukopenia and mild anemia.

Thus far almost everything fits in with the picture of lupus erythematosus. I have yet to find anything that would steer me away from this diagnosis except for the headaches and the pain in the back of the neck, which are a bit atypical.

Finally, she re-entered the hospital in coma. If we assume that this was disseminated lupus erythematosus, there are several possibilities to account for the coma. I think we can forget barbiturate poisoning, or at least not consider it seriously. Although picrotoxin was given, there is not much evidence to indicate that she took a lot of barbiturate. One cause of coma in a patient with lupus erythematosus is intracranial bleeding, particularly subarachnoid bleeding. This would also explain the headaches that she developed over a period of three or four weeks. There also could have been extensive intracerebral hemorrhage without localizing signs. Another possible cause of coma is an embolus from a verrucous endocarditis, which is common in disseminated lupus erythematosus.

I should like to consider other diagnoses and see if I can rule them out. One is periarteritis nodosa. In favor of this were the vague arthralgias, the development of hypertension, the albuminuria, the nosebleeds and the headaches. The skin lesions were not those of periarteritis nodosa. Furthermore, there were no characteristic tender nodules along the course of arteries, no eosinophils, no asthma and no leukocytosis. Leukopenia was a constant finding except during one episode of infection.

One should also consider dermatomyositis. In favor of this are muscle pains, weakness, fever and edema of the face. The skin lesions are quite consistent, but are more hemorrhagic than those usually seen in dermatomyositis. On the other hand the absence of muscle induration, leukopenia and arthralgia are against this diagnosis.

I shall also mention sarcoid, although there is little in favor of it. There was no bone, lung or spleen involvement, and the rash was not that of sarcoid. In addition, there was no generalized adenopathy.

The patient could have had an independent brain tumor to account for the last episode of headaches and coma, but there is nothing in the description to lead me to this.

I am left with a diagnosis of disseminated lupus erythematosus, ending fatally with subarachnoid or intracerebral hemorrhage, although there is no mention of serous involvement. I shall predict that there was fluid in the pericardium, pleura and peritoneum.

DR. TRACY B. MALLORY: Dr. Swartz, would you like to add anything?

DR. JACOB H. SWARTZ: My comment is more or less that of a dermatologist. I should like to add that it is unusual for lupus erythematosus to begin at such an early age.

Generalized lupus erythematosus superimposed on a discoid type should be distinguished from acute and subacute lupus erythematosus. I prefer to group acute and subacute lupus erythematosus with periarteritis nodosa and dermatomyositis. Frequently they cannot be differentiated by skin lesions or other manifestations, and I therefore disagree with some of Dr. Lerman's remarks. Periarteritis nodosa and dermatomyositis may have varied accompanying skin lesions. Furthermore, acute disseminated lupus erythematosus may have no skin manifestations or very few.

In these three diseases one can find clinically a good deal in common, such as pyrexia, arthralgia, splenomegaly, renal disturbance and thrombocytopenic purpura. Oral lesions may be present in dermatomyositis although not so commonly as in acute lupus erythematosus. Sensitivity to sunlight is present in all but more so in lupus erythematosus.

CLINICAL DIAGNOSES

Lupus erythematosus disseminatus.
Nembutal poisoning?

DR. LERMAN'S DIAGNOSIS

Disseminated lupus erythematosus, with terminal subarachnoid or intracerebral hemorrhage.

Anatomical Diagnoses

Disseminated lupus erythematosus.
Periarteritis nodosa of kidneys and pancreas.
Cerebral hemorrhage.
Bronchopneumonia, slight.

Pathological Discussion

Dr. Mallory: The chief gross findings were a completely adherent pericardium, a slightly hypertrophied heart and some very abnormal kidneys, which were larger than normal, with pale grayish discolorations and a few petechial hemorrhages. There was just a trace of bronchopneumonia. The immediate cause of death turned out to be a large cerebral hemorrhage, which had completely destroyed the left internal capsule and filled the left lateral ventricle and the third and fourth ventricles. Approximately 50 cc. of blood was evacuated. Microscopic examination provided a surprise in that the kidneys showed very characteristic and extensive lesions of periarteritis nodosa, and similar vascular changes were also seen in the pancreas but were not picked up in any other organs. The spleen was slightly enlarged, weighing 170 gm., and the splenic arterioles showed marked periarteriolar fibrosis of the type described as characteristic of lupus erythematosus, but which is certainly also seen occasionally in a variety of other diseases and is not present in all cases of lupus erythematosus. The case is reminiscent of one that the late Dr. Soma Weiss discussed here five years ago.[1] In that patient there was an initial onset of apparently characteristic thrombocytopenic purpura temporarily cured by splenectomy, but followed later by a characteristic clinical picture of acute disseminated lesions. That case at autopsy likewise showed typical anatomic lesions of periarteritis nodosa in the kidney, such as this one did.

We unfortunately have no histologic examination of the brain and so we cannot state whether the hemorrhage was due to local vascular lesions in the brain or to the purpuric tendency that is so characteristic of these patients. One is left with the question whether to make a diagnosis on the clinical syndrome, which would certainly be lupus erythematosus, or one based on histologic lesions, which would have to be periarteritis nodosa. In recent years the trend of opinion has been to regard periarteritis nodosa as a nonspecific vascular reaction that occurs in the course of a variety of diseases and has been reported in association with serum sickness, bronchial asthma, trichinosis and a variety of other conditions. My own preference for the primary diagnosis on this case is lupus erythematosus.

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MEDICAL OFFICERS FOR THE ARMED FORCES

AN EDITORIAL in the March 27 issue of the *Journal of the American Medical Association* states that the armed forces in 1943 will require six thousand physicians over and above those obtained from recent graduates, interns and residents and that the responsibility for supplying these medical officers rests largely, if not entirely, on the young physicians in the large cities of the country, particularly those of the eastern seaboard, including Boston. Furthermore, it is suggested that, if physicians who have been declared available by the Procurement and Assignment Service do not volunteer, the state medical journals publish lists containing the names of such men, as well as those of the men who are already in active service — an unpleasant and — one hopes — unnecessary threat that smacks a bit of the lack of one of the "freedoms" for which the United Nations are fighting.

Certainly no one should question the needs of the combat services for medical officers, even though some may wonder why the tables of organization of the United States Army and Navy call for greater numbers per fighting unit than do those of the Canadian and British forces, especially when the health of the civilian population, which has been called on to produce fantastic amounts of supplies and equipment, is of basic importance. On the other hand, until regulations more drastic than those now in existence are promulgated by the Selective Service System, most physicians, because of dependents, cannot be *made* to enter military service. The question whether a man is essential or available is often difficult to decide, and certainly some of the physicians who have been declared available have valid reasons for not volunteering. This, however, does not excuse the majority; if they are needed, — and they are, — they should be willing to make the sacrifices that millions of other men have already made. Failure to do so will leave just as large a blot on one's record of self-esteem as will indictment by the "bar of public opinion."

THE COMMISSIONER OF PUBLIC HEALTH

GOVERNOR SALTONSTALL'S choice of a man to succeed Dr. Paul J. Jakmauh as commissioner of public health was well considered.

The appointee, Dr. Vlado A. Getting, of Worcester, graduated from Harvard Medical School in 1935, and subsequently received the degrees of master of public health and doctor of public health from Harvard University. He interned at the Worcester City Hospital, and later became associated with the Massachusetts Department of Public Health, first as an assistant epidemiologist, then as director of a mosquito survey and eventually as a district health officer. In 1942 he became com-

missioner of health for the City of Worcester. Since 1939 he has held the positions of research assistant and assistant in epidemiology at the Harvard Medical School and the Harvard School of Public Health.

Having been forced to resign from the Medical Corps Reserve of the United States Army in 1942 because of physical disability, Dr. Getting now faces a responsibility that is as great as any that might arise in the armed forces. What he lacks in years of experience is more than counterbalanced by an excellent basic training in practical and administrative public-health matters, and the *Journal* takes this opportunity of extending to him its congratulations and of prophesying that his years of service will be marked by many advances accruing to the health of the people of the Commonwealth.

MEDICAL EPONYM

Trousseau's Phenomenon

Professor Armand Trousseau (1801–1867) of the Medical Clinic of the Faculty of Medicine of Paris describes this sign in a lecture on tetany which is included in the second volume (page 107) of his *Clinique Médicale de L'Hotel-Dieu de Paris* (Paris, 1862). A portion of the translation follows:

> One may cause the attack to recur at will, even in patients who have been free from them for twenty-four, thirty-six, forty-eight or seventy-two hours or even longer. In order to do this, it is enough, as I told you a moment ago, to exert *pressure on the affected limbs, whether over the course of the principal nerve trunks or over the blood vessels in such a way as to interfere with the arterial or venous circulation.*
>
> I was led by chance to discover this influence of pressure. While performing a phlebotomy from the arm . . . on a woman who was suffering from [tetanic] contractures, I noticed that as soon as constriction was made with the tourniquet, there resulted an attack in the corresponding hand. I first thought that congestion produced by compressing the veins was the cause. However, in seeking to understand this phenomenon more clearly, I found that in other patients compression of the arteries acted in identically the same manner. Since then I have repeated the experiment many times, and inasmuch as it results in no inconvenience for the patients, since the attacks cease immediately when the procedure is stopped, I have often performed it before you. Now you will have noticed that the contracture showed itself not only on interfering with the arterial or venous circulation, but also on exerting pressure either over the median nerve in the arm or on the brachial plexus above the clavicle, and was immediately preceded by a sensation of tingling, which is the first symptom. These muscular spasms occur on compression of the femoral artery after placing a ligature about the thigh, or more simply still by firmly squeezing it between the two hands or by pressing over the sciatic nerve, although it is not so easy in the lower extremities.
>
> This phenomenon, which is interesting in itself, is not without practical application. It may contribute something to diagnosis for in no other convulsive affection can one produce an effect of this nature by similar means.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

ANNUAL MEETING OF THE COUNCIL

The annual meeting of the Council will be held in the Georgian Room of the Hotel Statler, Boston, on Monday, May 24, 1943, at 7:00 p.m. This meeting will be preceded by the Cotting supper which will be served in the Salle Moderne of the same hotel at 6:00 p. m.

Business:

1. Presentation of record of the stated meeting of the Council held February 3, 1943. (Published in the *New England Journal of Medicine*, issue of March 18, 1943.)
2. Reports of standing and special committees.
3. Election of officers and orator.
4. Appointment of committees for ensuing year.
5. Such other business as may lawfully come before the meeting.

Michael A. Tighe, *Secretary*

The two following items are submitted for advance information to the members of the Council and of the Society:

Report of Committee on Nominations

The Committee on Nominations of the Massachusetts Medical Society met on April 14, 1943, at 8 Fenway, Boston, and selected the following list of officers for the year 1943–1944:

President: Roger I. Lee, Suffolk
Vice-president: Daniel B. Reardon, Norfolk South
President-elect: Elmer S. Bagnall, Essex North
Secretary: Michael A. Tighe, Middlesex North
Treasurer: Eliot Hubbard, Jr., Middlesex South
Assistant Treasurer: Norman A. Welch, Norfolk
Orator: Joseph C. Aub, Suffolk

Note from Executive Committee

The Committee to Aid the Boston Medical Library, on February 3, 1943, recommended that the earnings of the Massachusetts Medical Society's Building Fund be turned over to the Boston Medical Library "to make the library staff more efficient."

The Council referred this matter to the Executive Committee of the Council so "that the attention and study

which it deserves may be taken by it and that its report be given at least 20 days before the annual meeting, if it is possible to do so."

In compliance with this directive, the Executive Committee hereby gives notice that it will offer the following recommendations at the annual meeting of the Council to be held on May 24, 1943:

1. That the Massachusetts Medical Society acquire the space now occupied by the *Journal of Bone and Joint Surgery*.

2. That the Massachusetts Medical Society pay to the Boston Medical Library as maintenance a sum of money, up to $6500 per annum, for its quarters thus enlarged.

MICHAEL A. TIGHE, *Secretary*

DEATHS

KAAN — GEORGE W. KAAN, M.D., of Sharon, died April 14. He was in his eighty-ninth year.

Dr. Kaan received his degree from Harvard Medical School in 1890. As one of its two founders, he was active in the work of the Boston Dispensary for Women from 1900 until his retirement from practice in 1924. He was a member of the Massachusetts Medical Society and the American Medical Association.

Two daughters, a brother and two sisters survive him.

LAURIN — THEOPHILE LAURIN, M.D., of Lowell, died April 10. He was in his seventy-third year.

Dr. Laurin graduated from the Baltimore University School of Medicine in 1895 and from the University of Bishop College Faculty of Medicine, Montreal, in 1899. He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, two sons and three daughters survive him.

WAR ACTIVITIES

INDUSTRIAL HEALTH

TUBERCULOSIS IN INDUSTRY

Seventy-seven war industries in 11 states were surveyed by the eight 35-mm. photofluorographic units operating in industry prior to February 1, 1943, reports the Office of Tuberculosis Control, United States Public Health Service.

A total of 194,896 individuals were x-rayed. Tabulations on results are available for 125,190 people. Of these 1631, or 1.3 per cent, were found to have significant pulmonary tuberculosis. The distribution of the positive cases by stages of the disease was as follows: 874, or 53.6 per cent, minimal; 707, or 43.3 per cent, moderately advanced; and 50, or 3.1 per cent, far advanced.

In the District of Columbia, 28,098 government workers have been x-rayed. Exactly 300 cases of pulmonary tuberculosis have been discovered, an incidence of 1.1 per cent. Of these 182 (60.7 per cent) were minimal, 106 (35.3 per cent) moderately advanced and 12 (4.0 per cent) far advanced. In addition, 1300 workers at the National Institute of Health have been x-rayed. Among these, 15 cases of tuberculosis were found — 9 minimal and 6 moderately advanced. — Reprinted from *Industrial Hygiene* (March, 1943), a bulletin issued monthly by the Division of Industrial Hygiene, United States Public Health Service.

CORRESPONDENCE

RESTORATION OF LICENSE

To the Editor: At a meeting of the Board of Registration in Medicine held April 14, the Board voted to restore the license to practice medicine in the Commonwealth of Dr. Daniel E. Nyman, 31 Chandler Street, Arlington.

H. QUIMBY GALLUPE, M.D., *Secretary*
Board of Registration in Medicine

State House
Boston

DEPRIVATION OF LICENSE

To the Editor: At a meeting of the Board of Registration in Medicine held April 14, the Board voted to revoke the license of Dr. Solomon P. Bialow, 94 Adams Street, Waltham, Massachusetts, because of gross misconduct in the practice of his profession as shown by his conviction in court.

H. QUIMBY GALLUPE, M.D., *Secretary*
Board of Registration in Medicine

State House
Boston

BOOK REVIEWS

Doctors of the Mind: The story of psychiatry. By Marie Beynon Ray. 8°, cloth, 335 pp. Boston: Little, Brown and Company, 1942. $3.00.

This is an unusual type of book. The author has combined the history of psychiatry with an insight into the latest advances. She is a journalist and writer, an associate editor of *Harper's Bazaar* and a former editor of *Vogue*. She has read widely in the history of psychiatry, and often enlivens her knowledge by taking the reader into the clinic or hospital of a famous figure of the past.

Interwoven with this is a report on the newer knowledge, such as the shock treatment for schizophrenia and the history of frontal lobectomy. Names of men currently active in the profession are frequently quoted. The book is aimed to give the reader a view of psychiatry not only of the past but also of the present.

Written in a journalistic style, there is little, in the opinion of the reviewer, that appeals to the average doctor. Literature of this type, however, has a place, for one feels that the author has conscientiously gathered her facts, even if her enthusiasms have outweighed her sense of judgment. She has dramatized a good deal that for the scientist has little drama and tends to "oversell" doctors, particularly those who work in laboratories, to the public.

Night of Flame. By Dyson Carter. 8°, cloth, 337 pp. New York: Reynal and Hitchcock, Incorporated, 1942. $2.50.

The story is told about the drama of life within a hospital. It is a fast-moving narrative, packed with excitement and tragedy. The author has a good insight into hospital life, but like so many men writing novels of this type, he has packed into a brief space of time enough thrills to cover a hundred years of ordinary hospital life. The characters are somewhat overdrawn, and in the opinion of the reviewer, the book falls below the standard set by current similar works.